MODERN
Machine Shop

HOWARD CAMPBELL, Editor

Volume 8 SEPTEMBER, 1935 Number 4

A Magazine for Mechanical Executives: Construction Production Maintenance

Member

CCA

More Than 25,000 Circulation Each Issue

## CONTENTS

Page

THE METALLURGY OF WIRE ..... 21
By L. Dwight Granger

PUNCH PRESS OPERATIONS AND TOOLS, XI ..... 30
By C. L. Szalanczy

"IDEAS FROM READERS" SECTION

—A Hand Cranked Stock Feed, By Charles H. Willey ..... 40

—Jig for Sawing Slots in Pins, By J. J. Thompson ..... 40

—Anchoring in a Reamed Hole, By John A. Honegger ..... 42

—A Ball Bearing Milling Arbor Support, By Peter L. Budwitz ..... 44

—Block for Aligning Chuck, By J. E. Moore ..... 44

OFFICERS AND EXECUTIVES OF AMERICAN SUPPLY AND MACHINERY MANUFACTURERS' ASS'N., INC. ..... 48

NEW PRODUCTS ON DISPLAY AT THE MACHINE TOOL SHOW ..... 50
Continuation of the August "Preview Section"

NEW SHOP EQUIPMENT ..... 74

INDEX TO ADVERTISEMENTS ..... 150

Published monthly by Gardner Publications, Inc., 704 Race St., Cincinnati, Ohio. Copyrighted. Serial No. 529. Application is pending for acceptance under act of June 5, 1934.

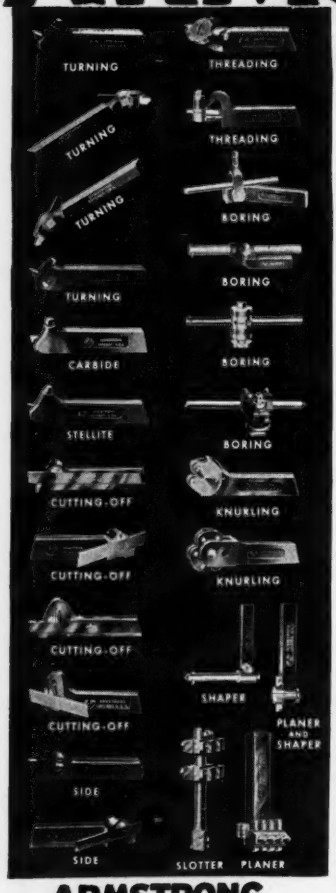
DON G. GARDNER, President and General Manager
JOHN M. KRINGS, National Advertising Manager

IVER W. LEE
Pacific Coast Manager
Los Angeles

GEORGE H. MEYERS
Western Manager
Chicago

GRANVILLE M. FILLMORE
Eastern Manager
New York City

# ARMSTRONG



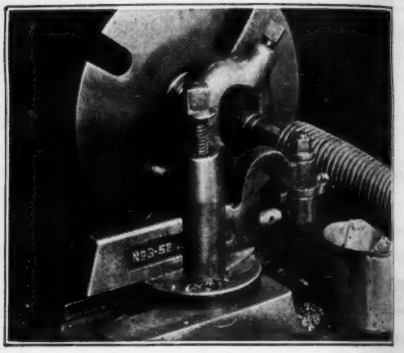

**ARMSTRONG**

Tool Holders, Turret Lathe and Screw Machine Tools. "C" Clamps, Lathe and Milling Machine Dogs, Ratchet Drills. Setting-Up Tools. High Speed Steel. Carbide Cutters, Machine Shop Specialties.

**ARMSTRONG BROS.**

Dies and Stocks, Receding Type Threaders, Pipe Cutters and Cutter Wheels, Pipe Vises, Pipe Wrenches and Chain Tongs.

**The Armstrong System of Tool Holders provides permanent multi-purpose tools for every operation on lathes, planers, slotters and shapers.**



## *Speed Up!* Your ARMSTRONG TOOL HOLDERS can take it

Why this "150 feet per minute" rule . . . not for ARMSTRONG TOOL HOLDERS. They need no babying—they will stand up to far greater cutting speeds. "150 f.p.m." is a carry-over from forged tool days, has no bearing on cutting tools of the Armstrong System. With the new ARMSTRONG High Speed Bits and Blades in ARMSTRONG TOOL HOLDERS cutting speed is limited only by your lathes (condition of bearings, power, critical speeds, etc.). Still many shops are still running on a "horse and buggy" schedule in spite of their equipment—are taking 1890 production out of 1935 machine hours; have never caught up to their ARMSTRONG metal cutting tools.

If costs are high and profits low SPEED UP output with ARMSTRONG TOOL HOLDERS on all machines, on lathes, planers, slotters and shapers. Order a few of the new ARMSTRONG High Speed Bits and Blades and "run test" on increased speed and feeds. It's time for new ratings, new production figures, new schedules . . . time to cut cutting-costs by catching up with the Armstrong System of Tool Holders.

Buy ARMSTRONG TOOLS from your Supply House

*Write for Catalog B-35*

## ARMSTRONG BROS. TOOL CO.

*"The Tool Holder People"*

328 N. FRANCISCO AVE., CHICAGO, U. S. A.

New York Sales Office: 109 Lafayette Street

London Branch: ARMSTRONG BROS. TOOL CO., Ltd.

ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

MODERN Machine Shop

CINCINNATI, OHIO VOL. 8, No. 4

SEPTEMBER, 1935

# The Metallurgy of Wire

BY L. DWIGHT GRANGER

**Asst. to Vice President, Wickwire Spencer Steel Company**

WIRE is so common a thing in our everyday lives that it is taken entirely as a matter of course, and little thought is given to the many different kinds that can be made, and to the multitude of precautions necessary to insure the quality and uniformity demanded by the user. In a process fundamentally so simple as the pulling of a piece of metal through a tapering hole in a die there are a surprising number of possible variations which, together with the many metals and metalloids available to the wire doctor in his materia metallurgica, enable him to diagnose his patient's specifications and to produce a wire to cure the case in hand.

We will try here to show a few of the "whys" and "hows" that are back of the properties of a wire, and to point out the difference between a fence wire, for instance, and a wire upon the quality of which lives depend, in a suspension bridge. These represent two extremes of contrast in specifications, and their metallurgy and manufacture involve problems that are fundamentally different.

Fence wire, nail wire and other such "common wires" are usually made from a basic open hearth or a bessemer steel. We will not try to describe any of the processes of steel making or of the casting and rolling of the steel to the wire rod form. A round rod, a little smaller than a pencil, is our raw material for the usual gauges of wire, No. 8 (0.162 in.) and finer, and our story will start with such a rod.

A large part of our quest for quality and composition has been expended before this point. Even as far back as the blast furnace, the proper combination of ores has been calculated, the proportion and analysis of pig iron and scrap to be used in the open hearth is rigidly specified, and a sufficient cropping practice is adopted to ensure sound steel. All these are carefully followed for low carbons, but high carbons are still more sensitive, and are given even greater care.

We receive the rod hot rolled, usually finished a little above the critical point, and therefore exhibiting a rather coarse structure. Figures 1

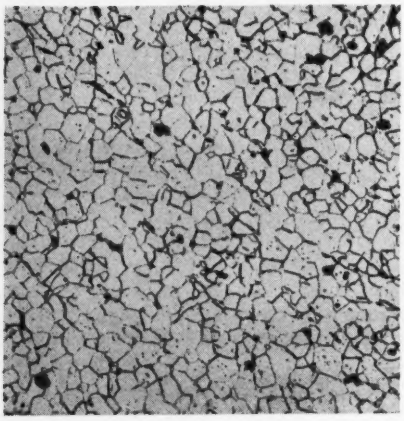


Fig. 1—Low carbon rod after hot rolling. Carbon 0.08 per cent. Magnification 100 diameters.

and 2 show respectively the structure of a low carbon (.08) and a high carbon (.65) rod as received from the mill. The white areas are ferrite—pure iron—and the black areas are pearlite, which is a compound of iron with iron carbide ($Fe_3C$) arranged in roughly parallel plates, and so named from a fancied pearly luster. It will be seen that the dark areas predominate in the high carbons, while the ferrite is the main constituent of the low carbon, and herein is the cause for all the differences in the treatment of low and high carbon steel.

Ferrite, being a pure metal, will not harden upon quenching from above its critical point. A steel containing much pearlite, however, hardens upon quenching, and, in accordance with the quantity of carbon present, may be made of almost any desired hardness. Pearlite, being a definite compound, varies in amount according to the carbon present; no carbon, no pearlite; about 70 carbon—100 per cent pearlite, or a saturated solution. Above 70 carbon, decreasing percentages of pearlite, and increasing amounts of cementite—the carbide of iron $Fe_3C$. Figure 3 shows the "supersaturated" conditions of a 100 per cent C rod, the black areas being, as usual, pearlite, and the white areas cementite.

In the manufacture of fence wire the low carbon rod is simply cleaned, coated, baked, and drawn the requisite number of drafts to the size required. In this drafting, however, very interesting things are taking place. The rod, having cooled fairly slowly, has provided a chance for the individual crystals to form in a more or less free and unrestrained manner. That is, there has been no axis on which the crystals have arranged themselves in preference to any other. This has been shown by x-ray analysis. A man by the name of Laue discovered that x-rays would reflect from crystal surfaces in exactly the same manner that light rays would, and so by working first on known crystals and then extending the study to other materials of crystallic structure, a science was evolved whereby the innermost secrets of the architecture of the atom were revealed.

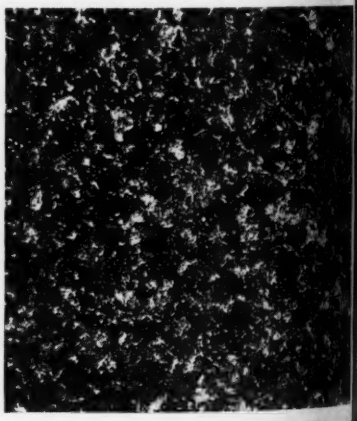


Fig. 2—Hot rolled No. 5 high carbon rod. Carbon 0.65 per cent. Magnification 1,00 diameters.

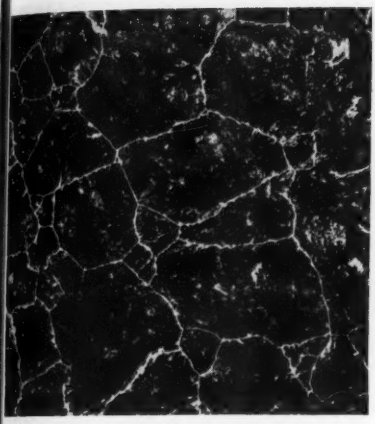


Fig. 3—Slowly-cooled high carbon steel. Carbon 1.10 per cent. Magnification 100 diameters.

Our rods, with the hit-or-miss crystals, upon being thus x-rayed and minute spots of light caught after hours of exposure on a photographic plate, show the picture in figure 4, the crystals reflecting in all directions in a uniform halo of light. When we commence to draw the wire, however, these infinitesimal crystals begin to come into line. Little by little they fall along side, and finally after a number of drafts they head largely in one direction. The x-ray now shows their faces in line, and the characteristic "wheel spoke" picture shown in Fig 5 is the result.

Let us see at the same time how the structures that we can see under the microscope have behaved. Figure 6 shows the same rod as in Fig 1 after one draft. The march of the crystals has begun. After five drafts, Fig 7, both pearlite and ferrite have elongated, and you can well imagine the crystals all heading "due east and west." The wire in this state is hard, and has lost much of its ductibility and elongation. It is just what the fence manufacturer wants, and after it is galvanized and the fence is woven, it will undoubtedly be "horse high and hog tight."

Let us suppose, however, that instead of making fences, our customer needs a softer, more ductile wire—one that he can bend, swage or twist. In this case we would perhaps stop a draft or so short of the final size,, and anneal the wire so as to restore its softness, ductility, and elongation. This is done by heating to the proper

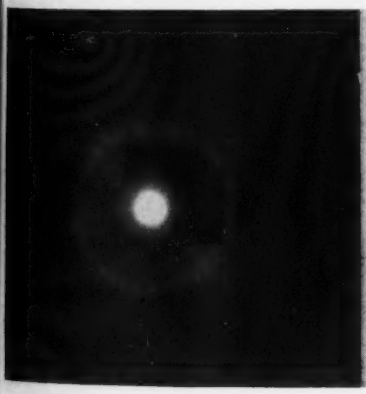


Fig. 4—Very speckled pattern indicating a coarse grain structure and uniform or random arrangement of crystals.

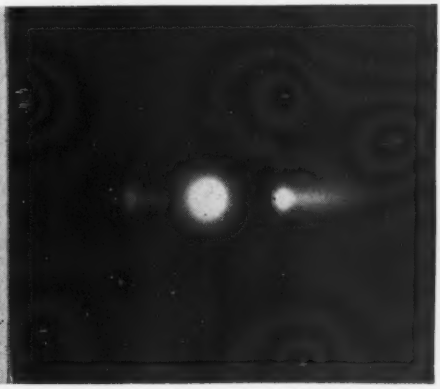


Fig. 5—Strong pattern with extremely marked preferred orientation and strain.

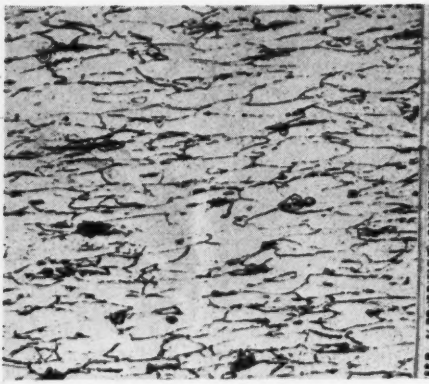


Fig. 6—Low carbon wire drawn one draft to 25 per cent reduction of area. Carbon 0.08 per cent. Magnification 200 diameters.

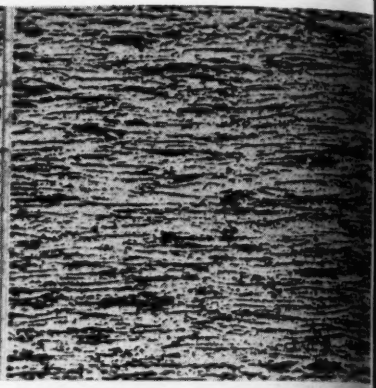


Fig. 7—Low carbon wire drawn five drafts to 87 per cent reduction of area. Carbon 0.08 per cent. Magnification 200 diameters.

temperature (and this depends upon the results desired) in huge cast iron pots. The structure after this would be like that in Fig. 8. The distortion of the ferrite is relieved, but the pearlite is still somewhat "stringy." If this is not soft enough, heating above the upper critical point will redistribute the cementite, and much the same structure as in Fig. 1 will be produced. The x-rays also testify to the incompleteness of the "process" anneal shown in Fig 8, and as evidence show traces remaining (Fig. 9) of the spoke-like structure, proving that the army of crystals is not perfectly "at ease."

How soft, then, we anneal, and how far we draft after annealing, depends upon the wishes of the user. He may specify a definite tensile strength (with a certain tolerance, of course), perhaps elongation, bending over a radius, torsion, upsetting, contraction in area upon breaking in tension, or stiffness, and the wire metallurgist mixes his prescription of carbon, manganese, sulphur, phosphorus, and silicon with perhaps a homeopathic dose of vanadium, titanium, columbium, or molybdenum, and produces the steel from which the particular combination of properties desired can be met. The microscope is a valuable guide and the x-ray is fast becoming a necessary adjunct to our equipment for determining quality and insuring uniformity.

In the case of wires in which strength and springiness are desired, we find an entirely different set of metallurgical problems based upon the capacity of the higher carbon steel to

Fig. 8—Low carbon wire process annealed. Carbon, 0.08 per cent. Magnification 200 diameters.

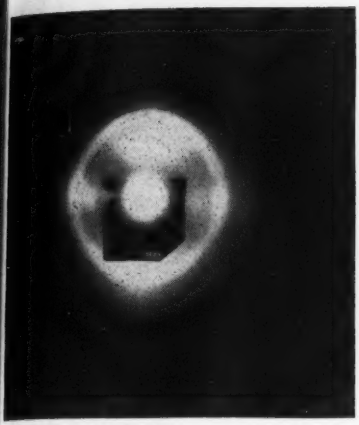


Fig. 9—Smooth rings nearly free from maxima and minima, indicating fine grained material free from preferred orientation and residual strain.

harden upon quenching. We anneal low carbons to produce softness. High carbons we "patent" to produce a definite hardness.

"Patenting"—so-called because somebody sometime patented the process—is a controlled means of continuously heating wire or rods above the critical point and cooling them at a predetermined rate so that a definite tensile strength and elongation are secured for further drafting. It is not a finishing, but a process operation.

A patenting furnace is a narrow heating chamber 25 to 50 feet long in which temperatures may be controlled within narrow limits, and through which a number of strands of wire can be pulled. At the outlet end there may be installed a kettle containing molten lead through which the heated wire passes on its way to the take-up blocks, and is thereby quenched at a very definite rate. Other kinds of wire are "air-quenched"; that is, they emerge from the furnace directly into the air, and cool more slowly than when lead-quenched. Each process has its field, the determining factor being the kind of wire. Spring wires, for instance, are almost always air-patented; while rope wire and the more specialized grades are more often lead-quenched.

The structure produced by patenting is one that is somewhere between martensite, which is the structure of a fully hardened steel, and pearlite, which is the structure of an annealed steel. Under the microscope these two structures are clearly defined, while the transition phases are somewhat shadowy and indistinct, and exhibit a fine grained uniform structure free from traces of either of the end structures. Such a structure is called "sorbite," and is shown in figure 10. This particular photograph is from a specially prepared specimen, and is somewhat finer grain than that usually desired for wire. Experience has taught that the wire drawn from this sorbite structure will have a greater toughness for the same strength than wire drawn from pearlite structures.

Low carbon steel, having small amounts of carbon, would not, of

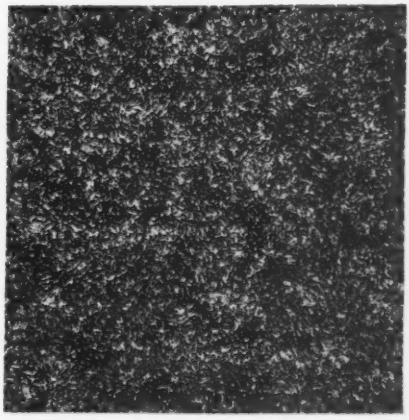


Fig. 10—Uniform sorbite. Carbon 0.60 per cent. Magnification 100 diameters.

course, harden in the patenting process, although at times low carbons are "continuous annealed" through the patenting furnace for purposes of greater uniformity.

For a "bridge" wire, we wish to produce a wire about 0.190 in. in diameter to have, among other specifications too detailed to enumerate, a tensile strength of 225,000 pounds per square inch after galvanizing; to have an elongation of not less than 2 per cent in 12 inches, and to wrap around a mandrel 1½ diameters (0.275 in.) without fracture.

For many years the practice was to use an acid open hearth steel—steel made in an open hearth furnace in which the lining was silica sand and chromite. As no elimination of phosphorus takes place with an acid slag, selected scrap and pig iron must be used to produce the desired analysis. Modern developments, however, have enabled the mill man to regulate a basic furnace (lining of dolomite) so that basic steels fully as clean and dependable as the acid open hearth steels may be produced and are now being used by some producers for bridge wire.

The analysis of the steel as poured from the furnace would run about as follows:

| | |
|---|---|
| Carbon | .80 |
| Manganese | .60 |
| Sulphur | .04 |
| Phosphorus | .03 |
| Silicon | .20 |

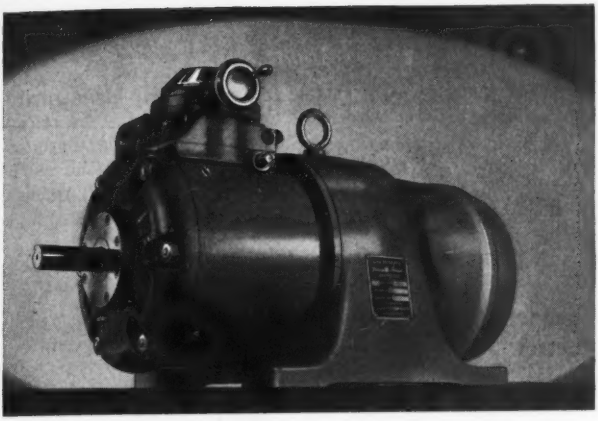
This, you will see, is a hypereutectoid steel (metallurgese for "supersaturated with carbon") and would have a structure in the hot rolled rod similar to that shown in Fig. 3, but with fewer white areas.

We will assume that the ingot has been reduced to a bloom, that the blooms have been rolled to billets, the billets inspected and chipped to cut out seams and laps, and the rod properly rolled, all with the suitable amount of top and bottom croppings so that only the sound "heart of the ingot" reaches us. For this size of wire it is necessary to roll a 7/16 in. diameter rod, and to reduce in 6 drafts to the finished size. The rod is patented, cleaned, sulled (given a coat of wet rust), limed and baked, and passed to the wire mill.

As this is an extremely high quality product, we would "lead patent" the rod, and would test both ends of every bundle to be sure we had the proper strength and elongation, for, lacking either of these, the wire produced would be useless. The furnace would heat the rod to about 1650 deg. F. and the quenching lead would be maintained at about 900 deg., the exact points being determined for each heat by means of samples. The microscope must show the proper grain size in the sorbite, and no pearlite should be present. The cleaning, sulling, and baking are done in the only way in which they ever should be done—thoroughly—and the rods are ready for drawing.

Bridge wire must be furnished in long lengths, which calls for special equipment that is not needed for regular grades, and therefore will not be considered here.

High carbon wires in general are drawn on a rod frame with blocks 22 in. to 30 in. in diameter, and revolving at 15 to 55 r.p.m, according to the size of the wire and other considerations of specifications. The drawing is divided into steps of 20 to 30 per cent reduction in area, this amount again being varied in accordance with conditions. Too heavy drawing reduces the ability of the wire to withstand torsion, but on the other hand produces a lower tensile wire than the same reduction in fewer drafts. A typical drafting schedule for bridge wire would be:



# Thousands of Speeds
## at the touch of a finger

**Speed infinitely adjustable** throughout entire range. Ratio, 6 to 1. Transmission and motor built as one compact, highly efficient unit.

Hardened steel rollers transmitting drive from constant speed input race to variable speed output race operate under torque - controlled contact pressure. Rollers inclined by operation of speed control roll themselves into required ratio position. Only finger touch required on control wheel.

RACES AND ROLLERS

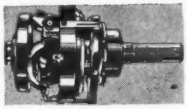
INCLINED ROLLER

Speeds may be pre-selected or adjusted while running.

With 1,750 r.p.m. motor, *any* speed from 600 to 3,600 r.p.m. immediately available. Built with 1,200 or 900 r.p.m. motors for correspondingly lower speeds.

Always starts from and stops in low-speed, high-torque position. . . . Avoids overloading motor.

**Positive drive is assured** under all conditions of loading, including rapid reversing or extreme overload.



RACE AND ROLLER ASSEMBLY

Unit is torque conscious. Automatic pressure device utilizes the imposed torque load to generate the required pressure between rollers and races. Pressure is always proportional to the input or output torque load—never exceeds requirements.

TORQUE FLANGE

Revolving parts in positive rolling contact are inherently in balance, assuring exceptional quietness and freedom from vibration at all speeds.

No adjustments of any kind are ever required. New Departure Ball Bearings used throughout.

**Outstanding ease of control** . . . Speed changes obtained instantly either by handwheel on unit or remote control to suit any type of installation. Full automatic cam-operated control for speed changes occuring in variously timed cycles.

SPEED CONTROL

TIME CONTROL

Time required for unit to shift up or down to any desired speed is readily adjustable. Minimum time, low to high or vice versa, three seconds.

Unit adapted to mounting in any position — vertical, horizontal, sidewall or ceiling.

Send for catalog PX, giving detailed description.

The New Departure Manufacturing Company, Bristol, Connecticut.

**NEW DEPARTURE**
*Variable Speed*
**TRANSITORQ**

Start $\frac{7}{16}$ rod (0.4375 inch)

| | |
|---|---|
| First draft to 0.381 | 24 per cent reduction |
| Second draft to 0.333 | 24 per cent reduction |
| Third draft to 0.289 | 24 per cent reduction |
| Fourth draft to 0.252 | 24 per cent reduction |
| Fifth draft to 0.219 | 24 per cent reduction |
| Sixth draft to 0.192 | 23 per cent reduction |

After every draft the wire is gaged to be sure that the process sizes are correct as, if the third draft should, for example, "cut out" five or ten thousandths on one end, an uneven reduction would occur on the next draft with consequent harm to the finished wire. No greater variation than 0.002 in. in diameter is allowed on any draft. Powdered soap is used as a lubricant as usual, and the drawing is completed in 6 drafts.

After the last draft, both ends of every coil of wire are tested for tensile strength, elongation, contraction in area, bending, and torsion. In addition a magnetic test has been developed in which the wire to be tested is run through an alternating current magnetic field, and the pattern produced on an oscillogram is compared with that of a standard specimen. If the two steels are alike the patterns are similar, but if any flaws, imperfections or ununiformity are present, they are immediately evident in a distorted figure which may be indicated for a routine test by the lighting of an electric light through a delicate system of vacuum tube and relays.

If the wire succeeds in passing all of these tests, it is sent to the galvanizing department where a heavy coat of zinc is applied, and then after another rigorous series of tests the wire is spooled and is ready to be spun.

The method for drawing bridge wire has been described in considerable detail as it fully exemplifies the various practices encountered in all high carbon wires. Other grades, such as spring wire for bedsprings, automobile seats and the like, go through exactly the same processes but on account of the less stringent specifications and particularly on account of the commercial considerations which must be met on a product made in such large quantities, lesser croppings may be made, drawing speeds may be faster, and less expensive charges may be used in the steel furnace. The same necessity for uniformity of heat treatment and analysis hold, however, as springs are turned out by the million on automatic machines on which adjustments must be minimized.

If fine sizes are required, the rod is patented, drawn to a "process" point, again patented, and then drawn further to finish. A No. 33 (.0118 in.) brush wire, such as is used for making scratch brushes, may have in its process of manufacture as many as four patentings and twenty-one drafts.

Coarse sizes of wire, both high and low carbon, may be drawn either "dry" or "wet." Dry drawing calls for the use in the die boxes of a specially made soap, granulated and thoroughly dry. For wet drawing, the wire is cleaned as usual, and then dipped into a solution of tin, copper sulphate, and rye meal liquor. This produces a contact deposit of copper and tin, the proportions being regulated in the coating solution to produce the color desired by the customer. The coppered wire is then stored in stock tubs of water and rye meal liquor until drawn. The lubricant is a solution of "figged soap" in water, the exact composition of which varies widely with different mills. Passage of the coppered wire through the dies burnishes the coating, and the familiar "liquor finish" is produced.

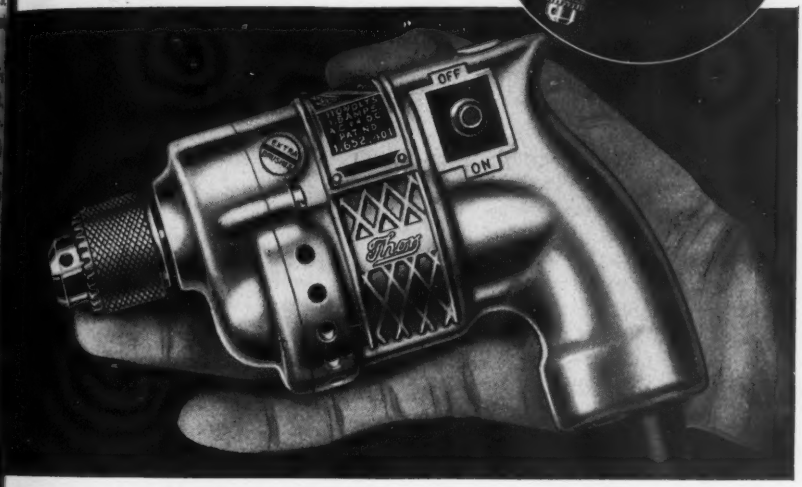
Many other grades of wire are made, of course, to suit individual requirements. Carbon percentages run the entire gamut from .04 to over 1.00. Manganese is a very helpful element, inducing toughness, aiding uni-

(Continued on page 46)

# Thor AGAIN LEADS

## The smallest, lightest weight electric drill ever built . . . . .

## The NEW Thor U-14 ¼" Drill




## 2½ lbs. As POWERFUL as tools TWICE its size

For many years there has been a very definite need in industry for a portable electric tool that was smaller, but that had equal power to the larger, heavier tools . . . one that would operate easily in one hand. . .increase efficiency and speed up production. . .that would serve equally well as a production or maintenance tool.

The NEW THOR U-14 ¼" Drill meets industry's demands on every count, without the sacrifice of any of the features now incorporated in the larger tools in the THOR line. Its size assures a greater degree of accuracy than ever possible in larger, hard to handle tools. The U-14 has the same hand wound armature and commutator construction that feature THOR "Motor Design," plus newer and more modern features of mechanical excellence which effect lower operating costs and increase service life. Same design and construction. . .same POWER. . .HALF the size. Write for technical description and demonstration.

**Independent Pneumatic Tool Co., 610 W. Jackson Blvd., Chicago**

TOOL MAKERS SINCE 1893

# Punch press Operations and Tools, XI

*In this article the author tells how special combination inside piercing dies are made for perforating parts after they have been drawn to shape for embossing.*

By C. L. Szalanczy

Tools and Equipment Department,
Westinghouse Electric & Mfg. Co.

In the regular production of punch press work, it occasionally happens that the work-pieces require holes that must be perforated in them after they are otherwise completed. This usually happens on drawn work and in pieces in which the holes are to be located in the sides. It is impractical to punch the holes in such a blank before drawing, however, as the holes become distorted in the drawing operation. If the punched holes are small, they will be elongated in the direction of the draw; if they are large, the work may draw correctly up to the center line and then will stretch to an extent which will probably fracture the metal along the two sides, due to the fact that the strain from the draw comes at these points. Lubricating the metal may help to overcome the trouble but will not entirely correct it.

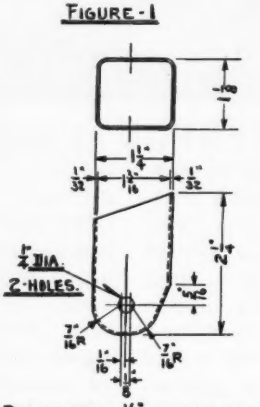
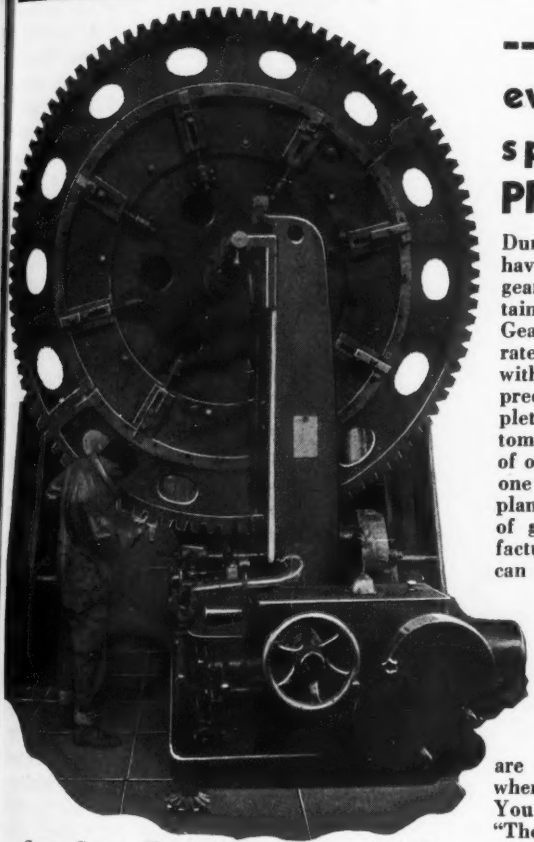



Fig. 1. — Drawing of blank produced by the side piercing die shown in Fig. 2.

The designer of the tool must anticipate these conditions and plan his tool line-up accordingly. It is unwise to pierce the blanks first and then try to draw them, especially when accurate location is required, since if the tool does not produce the part correctly, the piercing punches must be removed from the piercing and blanking die, the holes often have to be plugged to prevent marking the work, and a separate piercing die has to be made to follow the drawing operation. This change in the tool layout and construction of an additional die to produce the completed part increases the piece cost. This extra expense can be eliminated through correct tool design.

In Fig. 1 is illustrated a shell made of 1/32-in. half hard sheet brass, designed with two ¼-in. holes pierced into the side walls exactly opposite each other. The side piercing die used to pierce the two holes is illustrated in Fig 2. Since

# ACCURATELY MADE GEARS

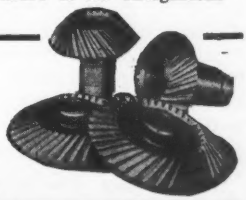


Spur Gears, Herringbone, Worm, Spiral-Bevel, Miter, Helical, Internal, Intermittent, Non-metallic Gears, Pinions, Racks, Ratchets and Pawls—are all made in various sizes.

## ---you get them every time you specify . . . . PHILADELPHIA

During the many years that we have been making all types of gears, we have constantly maintained the policy that every Gear would be made as accurately as was humanly possible with the aid of the most modern precision machinery. The complete satisfaction of our customers is proof of the success of our aims. Whether you need one gear for use on your own plant equipment or a quantity of gears for use in the manufacture of your products, you can be absolutely sure that by specifying Philadelphia Gears you are eliminating any possibility of trouble or disappointment. And as we have made a specialty of handling hurry orders and breakdown jobs you are certain of getting delivery when you need it.

You should have a copy of "The Gear Book" on hand for ready reference. It contains lots of valuable data. Send for a copy—there is no obligation.



**PHILADELPHIA GEAR WORKS**

*Industrial Gears and Speed Reducers*

**ERIE AVE. & G. ST., PHILADELPHIA**

*Branch Offices:*

New York: 330 W. 42nd St. Pittsburgh: Cham. of Comm. Bldg.

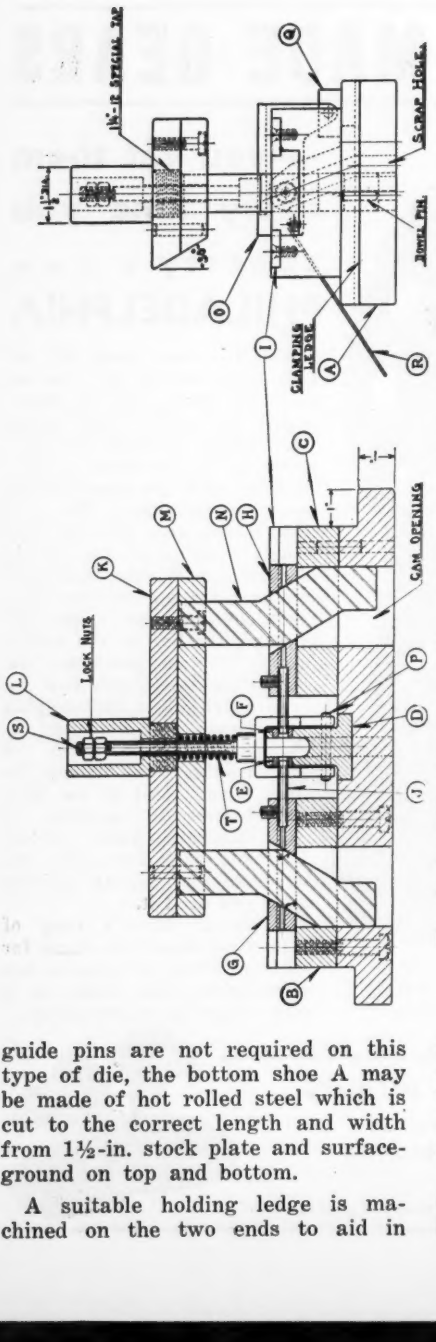



Fig. 2—Assembly drawing of side piercing die used to produce the blank shown in Fig. 1

guide pins are not required on this type of die, the bottom shoe A may be made of hot rolled steel which is cut to the correct length and width from 1½-in. stock plate and surface-ground on top and bottom.

A suitable holding ledge is machined on the two ends to aid in clamping the die to the press bed. This shoe supports the die blocks B and C, which are of hot rolled steel machined out to suit the slides and gibs. The blocks are anchored to the shoe A with fillister head screws and two dowels which prevent the dies from moving when engaged with the cams in the upper part of the die assembly. Clearance holes for the cams are provided through both the die blocks B and C and also through the lower shoe A.

The blank holder D, which is of hot rolled steel, is mounted in a slot that is machined into the die shoe A and anchored to it by means of fillister head screws and two dowel pins. The blank holder is finish-machined to a slip fit inside the formed blank which it supports during the piercing operation. A ½-in. hole is drilled through the blank holder and also through the bottom shoe A through which the scrap punchings drop into the pan located under the press bed. The two round piercing dies E and F are of high speed tool steel and are ¼-in. thick with a standard taper machined on the side. The dies are hardened and ground all over, and are press-fitted into the blank holder. The reason for making the dies only ¼-in. thick is that they can be used only until they become dull. In a tool of this type the dies cannot be ground and reset for continued use as the cutting surface, after grinding, would be below the face of the blank holder and would thus cause the material to bulge inward while in process of being pierced.

Since the walls of the shell are to be kept flat, this condition must not be allowed to occur. Furthermore,

the blank would be difficult to remove from the blank holder if it were lodged in the die opening on the two sides. For these reasons it is best, when the run is to be large, to make several extra die bushings so that if the dies are dulled or become chipped they may easily be removed and a new set inserted without much loss of time.

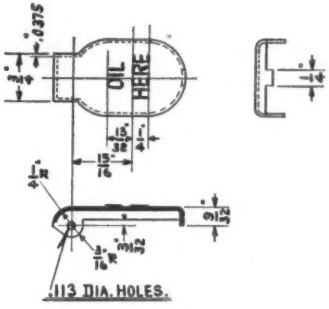
The slides G and H are of a low grade of tool steel, finish-machined and oil hardened to resist wear. These slides have holes in which the piercing punches are placed, and are also provided with knock-out holes slightly smaller in diameter than the punches. Tapped holes are provided for the headless setscrews with which the punches are fastened to prevent them from being pulled out while being stripped from the blank on the up-stroke of the press. The slot for the cam is machined in on an angle of 30 degrees for quick movement in a short space. This slot is made to a slip fit for the stationary cam.

A ledge is machined on the two long upper sides to let the gibs extend over about ⅛ inch so as to hold the slide down in place, and a $\frac{1}{16}$ inch undercut is usually machined on the bottom to enable the slide to move easier. This undercut also helps in case dirt or metal fragments get onto the sliding surface. A little oil should be applied to the surface occasionally. The gibs I may be made of ¼x1-in. cold rolled steel strap and are drilled and countersunk for flat head screws to keep the slide from rising. Four gibs are required on the die.

The piercing punches J are of high speed tool steel. After machining, they are hardened and ground to the correct size as specified on the drawings. The hardness point is determined mainly by the size of the punch. If it is small and fragile, it should not be hardened past 68 to 70 points Scleroscope; if it is ¼-in. or larger in diameter, it can be hardened to 80 to 90 points Scleroscope. It is best to have the back end of the punch soft so that it will to a certain extent act as a cushion for the punch while piercing. A small flat is ground on the punch to serve as a seat for the setscrew.

The top shoe K is cut from ¾-in.

FIGURE · 3




BLANK FROM .0375 C.R. STEEL.

**Fig. 3—Blank made by the combination die illustrated in Fig. 4**

hot rolled steel plate and is ground on the top and bottom surfaces. A 1¼-in. 12-thd. hole is tapped in the center of the plate to hold the stock punch holder stem L, which is anchored with a $\frac{5}{16}$-in. 18-thd. headless setscrew.

The cam holder M is also cut from ¾-in. hot rolled steel, and is ground flat on the top and bottom surfaces. It is provided with two slots in which the two cams N, which actuate the slides, are placed. The cams, which are made from low grade tool steel, finish machined and case hardened, are press fitted in and riveted over the upper side so that they will be held solidly. The cam holding plate is

fastened to the top shoe K by fillister head screws and dowel pins.

The stripper O is made of hot rolled steel, shaped out to fit down over the blank. As the piercing

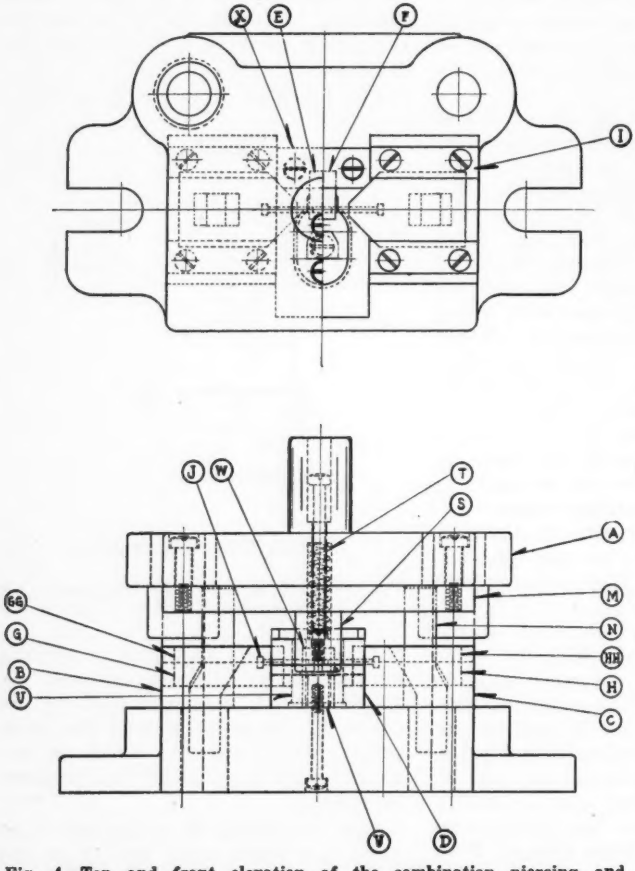



Fig. 4—Top and front elevation of the combination piercing and embossing die used to finish the blank shown in Fig. 3

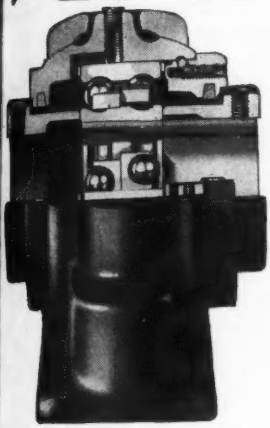
punches pass through the stripper before they enter the material, the holes in the stripper are tapered to help guide the punches. The extended part of the stripper at the rear is hinged on a stub steel pin P that passes through the cold rolled steel support block Q. This block is a tached to the die shoe A with tw fillister head screws that enter fro the bottom, and is properly locate by two dowel pins.

A handle of j in. cold roll sheet steel, ind cated at R, hinged at th front of the strip per. With th handle the pre operator ca move the strippe out of the way t that he can loa and unload th blanks on th blank holder.

The hold-dow S is of rou cold rolled ste The shank turned down a the end is threa ed for the t ⅜-in. 16-thd. he agon nuts wi which the hol down is lock and adjusted that it will ca tact the strip correctly. Th compressi spring T allo the hold-do to move, wh maintaining constant pressu on the stripp The cam hol plate is drilled out to clear the spri and the punch stem is counterbo to allow a socket wrench to en when adjusting the hold-down.

It should be noted that both the shoe and the cam holding plate machined off at an angle in the fr

# Now . . . A NEW LINE OF CJB PILLOW BLOCKS



## EMBRACING THE GREATEST IMPROVEMENTS IN THE LAST 20 YEARS

The Ahlberg Bearing Company with its firmly established reputation for bearing quality and dependability now offers a new and remarkable line of CJB Pillow Blocks designed to meet an unusually wide range of applications and embodying the following outstanding advantages. Write for temporary engineering data or see them at the Machine Tool Show, Booth E—301.

## Nine NEW AND EXCLUSIVE FEATURES

Supplied in Unit Type (light, normal, and medium duty) and Ball and Socket Type (standard and heavy duty) thus providing two distinct types which permit a selection of nine capacities for a given shaft size (inch dimension) and four additional capacities for each standard metric shaft diameter.

All types are fitted with felt seals to prevent entrance of foreign matter and retain lubricant. In addition the Medium and Heavy Duty Types are equipped with labyrinth closure necessitating no added cost for flingers or special closures.

The Standard and Heavy Types are made with a ball and socket type of housing which permits the installation of the heavy duty rigid type double row ball bearing and includes features which compensate for variations in the alignment of house and shafting.

The Standard and Heavy Types also employ a patented method of drawing the bearing onto the adapter. Easily located and fixed to the shaft without opening the Pillow Block. Cannot overload bearing by reason of too much take-up, yet due to the tapping action of adapter around shaft, the possibility of slippage is eliminated. The adapter, being of one-piece special construction, permits the use of oil for lubrication, which is very desirable at high speeds without loss of lubricant.

**5** The Medium Duty Straight Bore Type, No. 92000 Series, provides for mounting directly on the shaft. This is recognized as the superior method if shafting is held to close tolerances. This Type can be supplied in either inch or metric bores.

**6** Both Medium and Heavy Duty Types employ a patented locking device for fixing the end cap without the use of threads; therefore the direction of shaft rotation is optional.

**7** The Medium Duty Type, when employed for exacting applications, utilizes a countersunk shaft, using the drilled holes as a drill bushing. The collar is then rotated 90 degrees and the set screws placed in position. The offsetting of the drilled and tapered holes provides an internal pressure against the inner ring, thus locking it securely to the shaft.

**8** The Heavy Duty Tapered Bore Type is designed for mounting on standard shafting and compensates for a normal amount of variation in tolerances.

**9** Aside from their mechanical perfection these new Pillow Blocks are noteworthy examples of modern machine design in which appearance and ruggedness have been combined in a most pleasing effect. Units are finished in silver grey with red trim.

**AHLBERG BEARING CO.**
**00 EAST 29th STREET, CHICAGO**

so as to allow the stripper handle to move back out of the way when the stripper is raised for loading or unloading the die.

**Special Combination Die**

In some cases a special combination die is used, the design of which

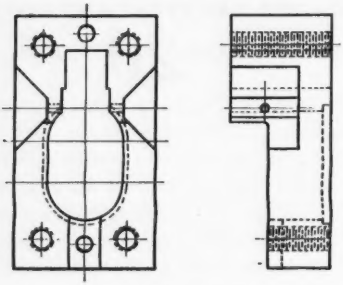



**Fig. 5—Drawing of the die block D**

involves the mechanism used in the side piercing die together with additional parts.

The partly finished blank of a cover, made from 0.0375-in. sheet steel, is illustrated in Fig 3. Having been blanked and drawn to shape in previous operations, the cover must now be embossed with the words "OIL HERE" and two holes for mounting must be pierced in the sides. These two operations are performed with a combination tool which is shown in Fig. 4. The tool is similar to the side piercing die shown in Fig. 2, with slight changes.

In this case it is best to set the die into a standard die set that is equipped with guide pins and corresponding bushings. The die set is marked **A** in the illustration. The die blocks **B** and **C**, top plate **M**, holddown **S** with its compression spring **T** and the gibs **I** are all identical with those used in the piercing die previously described.

The slides **G** and **H** are of low grade tool steel, as in the other die, but they are made in two separa pieces which are fastened togeth with four fillister head screws and t dowels. The slides are made in th manner because the piercing punch **J** are made with shouldered ends, d to the fact that it is harder to pier the cold rolled steel blanks and mo backing surface is required. T upper and lower parts of the ali contain each half of the form of th piercing punch and when they a placed together and fastened, the permanently lock the punch **J** piercing position with no chance it pulling out. The upper parts the slides are indicated at **GG** a **HH**. The slides are machined off an angle on the piercing end to allo them to pass in over the die block

The die block **D**, which is sho separately in Fig. 5, is of hot roll steel finish machined to let the fillin piece **U** and the two die pieces and **F** to be slip-fitted into it. T die block also acts as the stripp for the piercing punches. The bloc

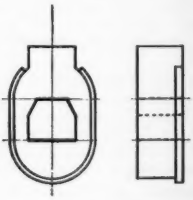



**Fig. 6—Detail drawing of the filling pie**

is fastened to the die shoe with fill ter head screws and dowel pins.

The filling piece **U**, shown in F 6, is of tool steel, and is held in pla by the shoulder on the bottom. Th piece locates the female part e bossing die **V**, which is usually p chased from an engraving conce

WHEN selecting that new machine, give more than a passing thought to how it is lubricated. Two machines may be years apart in lubricating equipment. One may have the up-to-date BIJUR AUTOMATIC LUBRICATOR while the other may rely on the old hit-or-miss method.

Make no mistake about it, machines with BIJUR built-in lubrication are more economical because they eliminate lubricating labor, save lubricant, require less power, give more safety, last longer.

**BIJUR**

**Bijur Lubricating Corporation**
2200 Forty-Third Avenue
Long Island City, N. Y.

The finish and hardening are also left to the supplier in such a case, likewise the finish and hardening of the upper or punch part W.

The hold-down pad S is fastened to the upper member of the die by

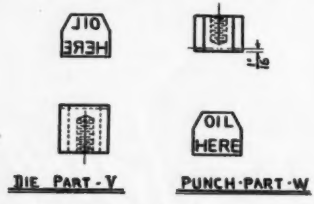



**Fig. 7—Punch and die for the embossing operation**

means of two fillister head screws that slip fit into the holes provided for them. One of these holes passes through the punch stem, while the other is in the punch shoe far enough away to allow the compression spring T to be placed between them. The compression spring is let into the upper shoe and sets on the head of the ¼-in. 20-thd. fillister head screw that is used to hold the embossing punch W in place in the hold-down pad. The holes for all three of these

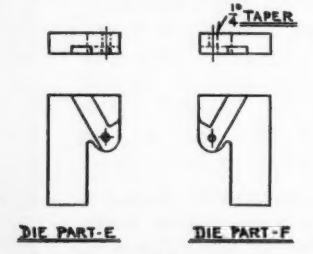



**Fig. 8—Drawing of the two die parts for the piercing operation**

screws are counterbored to allow up-and-down movement of the heads.

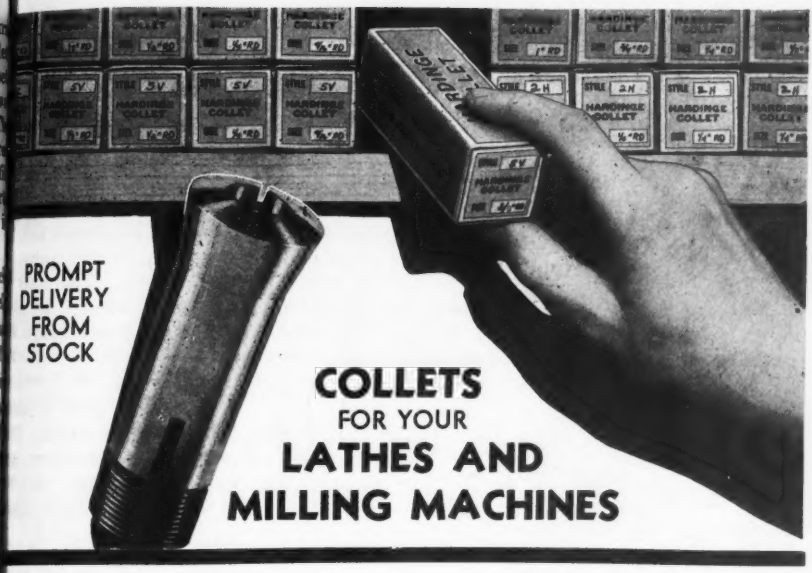
The hold-down pad exerts a steady pressure on the blank and thus prevents distortion during the embossing operation, yet the pressure must not be so great as to prevent the natu "flow" of the material while the le ters are being formed. The final s ting comes, of course, when the r is at the bottom of its stroke. T lower embossing part V is anchor to the bottom shoe with a single lister head screw. The two die par for the embossing die are shown Fig. 7.

The piercing dies E and F, whi are of hardened high speed tool ste are shown in detail in Fig. 8. T two die pieces are made right and le hand and fit side by side into the d block D, where they are held in pla by the small cold rolled steel gib which is fastened in the rear on t top of the block. The piercing acti is actuated by cams of the same ty as those used in the piercing die.

---

**A TREATISE ON THE GRINDING CEMENTED CARBIDES.** Here is a page book, well printed on a high gra enamel stock, presents to the reader fund of information concerning t origin, characteristics, and uses of mented carbides. The information co tained in the volume has been secur through the assistance and cooperati of all of the various firms who produ and market the different kinds of c bides in this country.

Of particular interest is the chap "Factors Affecting Grinding Wheel A tion on Cemented Carbides." The cha ter discusses in order Properties of t Material to be Ground; Amount Stock to be Removed; Finish Requir Method of Supporting the Work; Si of Wheel; Speed of Wheel; Shape Wheel Face to be Maintained; Coolan and Skill of Operator. Instructions given, with illustrations, for grindi the tools, and drawings show clea how the table of the machine sho be set and how the tool should handled to obtain the best results. T data includes information regarding grinding of form tools, circular fo tools, milling cutters, and special to A copy of the book will be sent to mechanical executive. Address The C borundum Company, Niagara Falls, N




## Attractive Prices---Ask for Catalog No. 35A

Worn out, inaccurate or missing collets render your lathes and milling machines useless. Check your sets of collets and order the required sizes so they will be available when needed.

All styles stock for Hendey, American, Monarch, Hardinge, Rockford, Sidney, Pratt & Whitney, South Bend, LeBlond, Springfield, Cincinnati, Sebastian, Etc., Lathes.

All styles in stock for Van Norman, Hardinge, Burke, Becker, Etc., Milling Machines.

• ORDER FROM NEAREST STOCK—STOCKS CONSTANTLY MAINTAINED AT:

- **HARDINGE BROTHERS, INC., General Offices & Factory.....ELMIRA, NEW YORK**
- **HARDINGE BROTHERS, INC., 544 W. Washington Blvd.....CHICAGO, ILLINOIS**
- **HARDINGE BROTHERS, INC., 2970 W. Grand Blvd.....DETROIT, MICHIGAN**
- **HARDINGE BROTHERS, INC., 277 Lafayette Street.....NEW YORK, NEW YORK**
- **ECCLES & DAVIES MACH. CO., INC., 1910 Sante Fe Ave.....LOS ANGELES, CALIF.**

# HARDINGE

COLLETS SINCE 1890

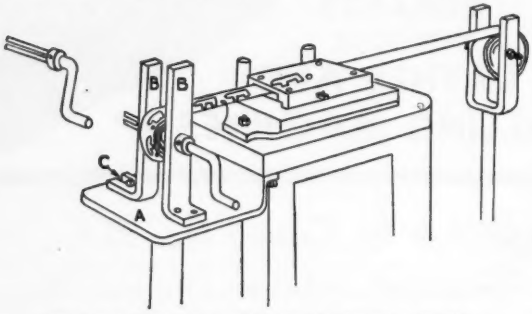
# Ideas from Readers

This department is a clearing house for ideas . . . If there is a "kink" or short cu in use in your shop, send in a description of it . . . Each one published will be paid for.

## A Hand-Cranked Stock Feed

By Chas. H. Willey

IN these modern times it may be that the idea illustrated in the drawing will be criticized severely, but there are still a number of small plants with perhaps one or two presses where the amount of stampings made from strip stock is so small that the use of a power stock feed seems uneconomical.




Design of Hand-Cranked Stock Feeding Device

For dies that have spacing stops on them and are so made that the stamping drops through the die, the hand-cranked feed is a very handy device. It is also far more reliable and faster than the plain "eye-and-hand" feeding method. The drawing illustrates the simplicity of design and application of the hand-feed to the press.

The plate A is bolted to the platen of the press and the two uprights B-B are secured to this plate, one of the uprights being slotted as at C for adjustment for the various widths of stock. The crank is slotted to t the end of the strip, which provi a grip for the winding. The start the feeding must, of course, be d by hand until the strip is through t die far enough to grip it with crank, then the crank used and tension is ma tained on the stock. T method is positive a avoids injuries to hands which might oth wise be caused by sharp edges of the sto

The device will quic pay for itself in the e and speed with which st stock can be handled.

## Jig for Sawing Slots in Pi

By J. J. Thompson

RECENTLY it became necessary make up some special pins, e of which was to have a slotted head fit a screw driver. The pins w ¼-in. diameter and 2½-in. l threaded for a distance of ¾-in. one end. As the pins were needed lots of several hundred at a time, most economical production meth possible were necessary.

The pin could be manufactured an automatic lathe excepting for slot in the end. To saw the slot hand was a slow and expens method, yet the cost of a jig for p forming this operation on a prod tion basis seemed even more imp

# The Most Vital Part of the Tap is HERE

**THE Teeth are its "cutting tools"—if they fail the tap fails.**

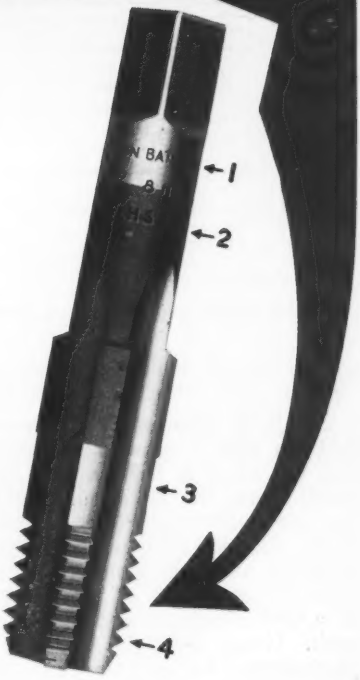
**Soft Teeth" (a frequent cause of tap failures) are the result of improper heat treatment.**

The photograph at the right shows 4 of the major steps a Bath tap goes thru. Please note that no teeth are produced until after the tap has been HARDENED IN THE SOLID.

1. **Shows the amount of material removed in grinding the shank.**
2. **Shows the unfinished hardened surface as it comes from the heat treatment.**
3. **Grinding on the major diameter. Note that sufficient material has been removed from the tap blank so that all hardening decarbonization is removed from the tops of the teeth.**
4. **Threads which are GROUND FROM THE SOLID—AFTER HARDENING.**

By this process the grain structure of the teeth is just as perfectly heat treated as the core section of the tap. In bringing a tap blank, which has been rough threaded before hardening, up to the proper heat, the teeth become overheated which results in a coarse and brittle grain structure on the teeth which are the "cutting tools" of the tap.

**TAPS PRODUCED BY THE BATH PROCESS GIVE MORE HOLES PER GRIND AND LONGER TAP LIFE.**

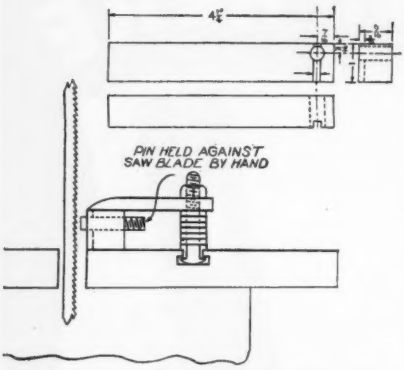



*We cordially invite you to visit our booth A-101 at the Cleveland Machine Tool Show.*

## JOHN BATH & COMPANY, INC.

WORCESTER, MASS.

tical. After some experimenting we decided to saw the slots by using an upright metal cutting bandsaw, using a simple, inexpensive jig. The jig was made from a piece of 1-in. scrap




**Jig for slotting heads of pins or screws**

steel $\frac{9}{16}$-in. wide and 4¼ inches long, and the cost of the jig was 40 cents.

The jig is clamped to the machine table in close proximity to the saw, and the piece is held in the jig by hand. Thus the piece can be fed to the saw until the slot is cut to the depth desired, with no time lost in clamping and unclamping. The slots were cut at a rate of 200 per hour, at a cost of approximately 1½ cents each. It can readily be seen that this method can be used for any shape or size of piece requiring a screw slot in the head.

## Anchoring in a Reamed Hole

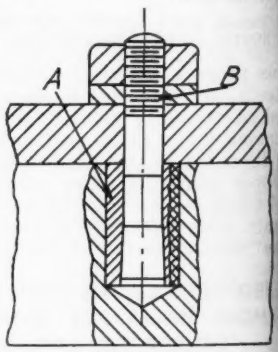
By John A. Honegger

RECENTLY the writer was confronted with the task of clamping several nest plates to a large die in which the only holes were two straight reamed holes. The die had been hardened, of course, and it was not considered a practical idea to anneal it as there were several se tions that might warp out of shape the re-hardening.

The method illustrated in the dra ing was finally adopted, and worked out so satisfactorily that has become standard practice in t shop.

The idea is merely an applicati of the expansion bolt principle. bushing A was made and turned to slip fit in the hole in the die. The ou side was then knurled with a coar knurl and the hole was bored tap as shown. When finished, the bus ing was split into halves. The st B was then made and taper-turn to fit the taper bore of the bushi When these parts were assembled t gether, they fitted snugly into t hole.

A hole for the stud having be provided in the nest plate, the ne plate was located in the correct po tion on the face of the die and a chored with two clamps with t stud projecting through the hole. T

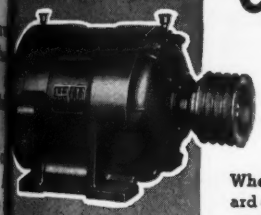


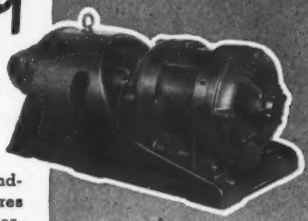

**Method of anchoring in a smooth or blind hole**

washer was then placed on the st and the nut was tightened, causing t taper on the stud to rise in the sp bushing and forcing the halves of bushing against the sides of the h

# NAME YOUR MOTOR REQUIREMENTS

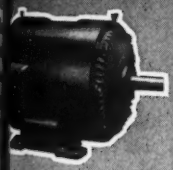
## We supply them!

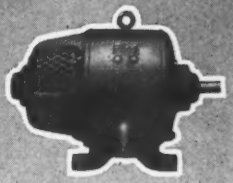


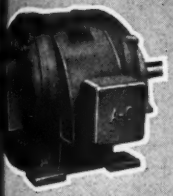


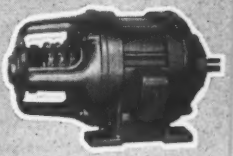
**Whether your motor requirements are standard or special, or whether the desired features concern mountings or electrical characteristics makes no difference . . . we supply your motor needs and do so with performance plus.**

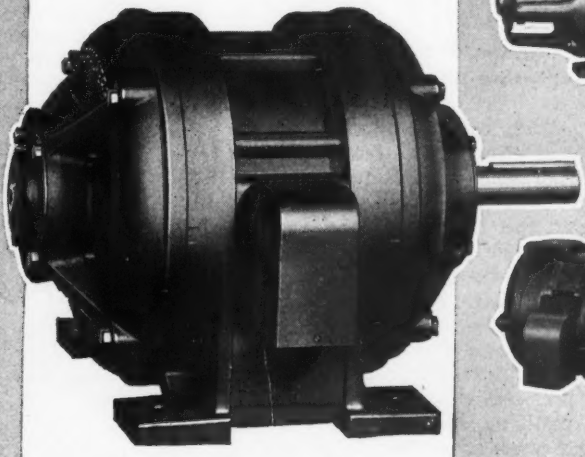
**All the knowledge gleaned from more than 45 years of pioneering in the building of motors and all the experience acquired in producing motors for its own vast line of rugged power driven machinery is the inheritance of Allis-Chalmers Motors today. That knowledge, that experience and the guiding principle of quality as an ideal are built into every Allis-Chalmers Motor. They are the sturdiest motors on the market—bar none. • Allis-Chalmers district offices in all principal cities are ready to assist you in all problems of motor application for standard or special drives.**











# MOTORS

FOR EVERY PURPOSE

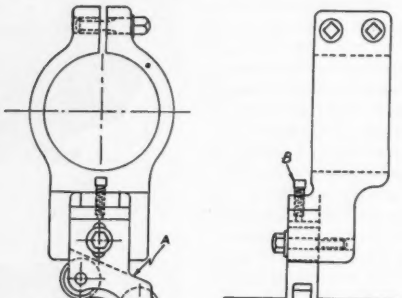
ALLIS-CHALMERS MFG. CO. MILWAUKEE, WISCONSIN

with tremendous force. The stud holds solidly enough to withstand stripping action against the nest plates.

## A Ball Bearing Milling Arbor Support

By Peter L. Budwitz

A MILLING arbor support that is applicable to any type of milling machine is shown in the illustra-




**Ball Bearing Milling Arbor Support**

tion. An advantage of this support is that it offers no obstruction below the arbor collars; thus it is possible to use cutters of small diameter without the danger of the support striking some portion of the milling set-up or fixture.

Ball bearings are utilized in this support, the bearings being located at points diametrically opposite the direction of thrust induced by the cutting pressure of the milling cutter, thus avoiding all tendencies of the milling arbor to spring.

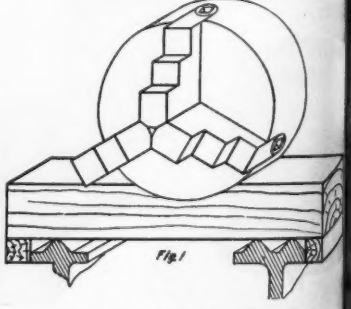
The main portion of the support is of cast iron and has an opening cut in it for receiving the part A. This part is of machine steel and retains the ball bearings. An elongated slot is provided in the part A for adjustment, which is accomplished with the screw B. This adjustment feature makes it possible to use the rest on any arbor regardless of the size of the collars. A clamping screw is provided to hold the part A rigid after it has been adjusted.

## Block for Aligning Chuck

By J. E. Moore

IN THE vocation high school in which I teach machine shop practice, we have many boys who are either not strong enough or too awkward to lift and hold the heavy lathe chucks while they are threading the chucks onto the spindles noses of the lathes. The result has been that the ways were in several instances badly dented and there have been numerous cases of smashed fingers.

To eliminate this difficulty we made some wooden blocks similar to the one shown in the illustration. The block is of oak and has two cleats on the bottom, cross wise and just far enough apart to span the lathe bed. The top of the block is hollowed out to fit the contour of the chuck and




**Block for aligning lathe chuck**

is just the right height to bring the threads in the adapter plate on the chuck in line with the threads on the nose of the machine spindle.

# FOR SMALL JIG AND FIXTURE WORK, BURRING, TAPPING, COUNTER-SINKING, AND BENCH ASSEMBLY DRILLING

The No. 13 Simplex—a drill you can depend upon for accurate, efficient, low-cost drilling. Its numerous applications and special arrangements especially fit it for general utility. The entire head travels up and down on column and may be swung around at any angle. Spindle is stationary and forms part of the head. Mounted on two radial thrust ball bearings. Four spindle speeds. Four-step "sheave" pulley with V-belt! These are but a few of the numerous features you'll find in the Buffalo" No. 13.

*Send for circular 2844-A.*

**BUFFALO FORGE COMPANY**

BROADWAY BUFFALO, N. Y.

In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Buffalo No. 13 Simplex

Price 24.00

Without motor

f. o. b. Buffalo, N. Y.

(Continued from page 28)

formity in air patenting, and neutralizing the ill effects of the unavoidable sulphur. Silicon plays a part in controlling the grain size of steel, and nickel and chromium reduce its tendency to rust. Vanadium is used as a scavenger to remove troublesome oxides, and great claims are made for molybdenum as a toughener. The automobile and the aeroplane have presented extremely difficult problems and have been responsible for much of the advance in wire-making technology; valve spring wire for aeroplanes must be practically perfect.

The solution of these difficult problems has been assisted greatly by the study of the inherent grain size of the steel used. This test, developed by McQuaid and Ehn in 1922, was first applied to steel for carbonizing, but it was soon found that the same conditions which produced a lack of u formity or of normality in these ste were responsible for many irregula ties in other steels, so that it is n safe to say that for any particula severe specifications the analy alone is not sufficient, and that unl the steel has the proper inhere characteristics, a large percentage rejections is probable.

Wire metallurgy then is a comple combination of chemistry, mechani heat, light, electricity, and magneti and we, with all our scientific ap ratus and delicate instruments, c not but marvel at the skill and a tistry of our predecessors who m so much progress with the r equipment at their disposal. We w der whether the advancement of o technique has been because of the d mands of the customer, or whet we have educated him to dem more.


# ◀ RACINE ▶

# Announces

## A *New* HYDRAULIC SA

**Pioneers in the application of Hydraulics to Power Hack Saws.**

*See the complete line at Booth No.* 106

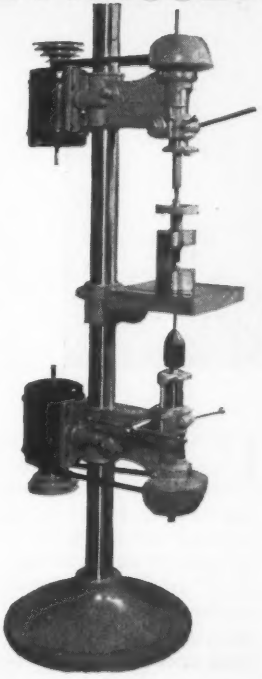
**RACINE TOOL & MACHINE CO., RACINE, WIS., U. S.**

# CUT PRODUCTION COSTS *with*

## DELTA LOW COST DRILL PRESSES

Priced as low as $29.95 for the bench model, Delta Quality Slo-Speed Drill Presses are being rapidly adopted in hundreds of factories for many types of metal drilling. Their initial cost is small—yet the service they render is a revelation! Some of the largest industrial concerns in the country, after careful trials, are reordering Delta Drill Presses in large numbers. Their range of speeds enables them to be used in any general shop with drills from No. 60 up to 17/32 with utmost efficiency.

Any of the three "Slo-Speed" models, bench or floor type, can be supplied with "Delta-Grip" chuck, Jacobs Chuck, Tapping Attachment or spindle for No. 1 Morse taper shanks. Floor model may be fitted with special production table. Write for full details about "Slo-Speed" Drill Presses and name of nearest dealer.



## EASILY ADAPTABLE FOR SPECIAL OPERATIONS

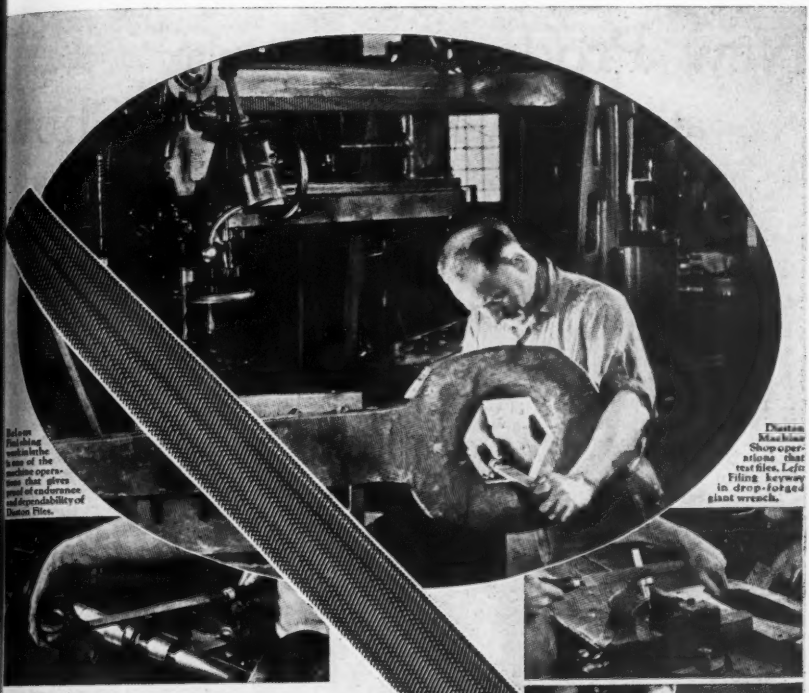
Illustration to the right shows special Delta Drill Press model adapted for special operation—this is but one of numerous instances of special adaptions of these economical quality drills.

**DELTA MFG. CO.**
616 E. VIENNA AVE.
MILWAUKEE, WIS.

## Officers and Executive Committee, American Supply & Machinery Manufacturers' Ass'n. Inc.

Top row—**L. M. Knouse**, Stanley Electric Tool Co. President; **Roger Tewksbury**, Oster Williams, 2nd Vice-President; **W. H. Fisher**, T. B. Woods Sons Co., Treasurer; **Horace Armstrong**, Armstrong Bros. Tool Co. Second row—**W. A. Purtell**, Holo-Krome Screw Corp.; **Charles E. Brinley**, American Pulley Company; **Herbert Ladds**, Lamson & Sessions Bolt Co.; **Harold A. Busby**, Keystone Lubricating Co. Bottom—**D. W. Northrup**, The Henry G. Thompson & Son Co.

IMPORTANT as production machines are, the effectiveness of the modern manufacturing plant depends to a great extent upon the tools and accessories with which it is equipped. The machine tool must be equipped with toolholders and cutting tools; it must be lubricated and the tools must be maintained in working condition by means of a coolant system; the application of power frequently depends upon belting or silent chains, together with pulleys and other transmission equipment. The American Supply & Manufacturers' Association, an organization of dealers in factory equipment and accessories, maintains a high standard of business practices among its members and thus ensures a high quality of service to its customers.



Below: Finishing teeth in the vise of the machine operator that gives proof of endurance and dependability of Disston Files.

Disston Machine Shop operations that test files. *Left:* Filing keyway in drop-forged giant wrench.

Above: Radius filing that requires files of smooth cutting ability. *Below:* Cleaning out punched sprocket holes test the durability of Disston slotting files.

# Machine Shop Proof

Steel of high grade, for all purposes, is produced by the Disston Works.

Every type saw is made here;

Every type of file, hundreds of kinds of tools, machines, machine parts manufactured, for all the world to use.

And files are consumed here by the thousands of dozens! — Consumed in operations that are much the same as the filing operations in your own plant—meeting production conditions as exacting as your own.

So, Disston Files are carefully made,—

With quality *pre*-determined by Disston Laboratory research . . . checked by laboratory tests, process inspections and tests, machine testing, and, finally, by performance in day-by-day service.

WRITE for Disston Metal-Cutting Manuals: "Files", "Hack Saws", Circular Saws", "Band Saws", etc. Free!

HALF-ROUND FILE. —Rugged, keen type of tooth, designed to remove metal rapidly without clogging, makes this file most desirable for machine shop use — the file with the strong heart and long life.

HENRY DISSTON & SONS, INC., 921 TACONY, PHILADELPHIA, U. S. A.

Branches: Bangor, Me., Boston, Chicago, Detroit, Memphis, New Orleans, Seattle, Portland, Ore., San Francisco, Vancouver, B. C.
*Canadian Factory:* Toronto

DISSTON

# New Products on display at the Machine Tool Show

## *A continuation of the "Prevue Section" in the August Issue*

### Seneca Falls Machine Company

**Seneca Falls, N. Y.**

***Booth No. 914, North Annex***

Among the Seneca Falls Lathes which comprise the major part of this exhibit are several of new design, including the Seneca Falls "Speedcut," the Lo-Swing Model U Automatic Lathe, the Lo-Swing Unitlathe and the Lo-Swing Imp.

The Seneca Falls "Speedcut" Lathe is designed and built to make possible the full advantages of carbide cutting tools. The spindle, which is mounted on precision pre-loaded ball bearings, is driven direct through V-belts from either a variable speed motor or a New Departure Transitory Unit. There are no gears on the spindle. The spindle drive pulley is mounted on its own ball bearings, thereby eliminating any belt pull on the spindle. Spindle speeds up to 3600 r.p.m are available.

**Lo-Swing Model U Automatic Lathe**

Three changes of feed are available through pick-off gears, providing a range of from 0.001 to 0.060 in. per revolution of the spindle. The apron is of the double wall type and the carriage is extremely heavy, being provided with a cross slide arranged to take tool blocks front and rear.

The "Speedcut" Lathe is available with or without rapid traverse to the carriage and the rapid traverse may be automatic if desired. When the machine is furnished with rapid traverse, the carriage is moved by means of a hand wheel in the conventional manner. On the plain rapid traverse machine this action is manually controlled by means of a lever at the right of the apron. When automatic rapid traverse is supplied, the machine is started by lifting the control lever, which starts the main motor and throws in the rapid traverse forward. When the tool reaches the work, the rapid traverse is thrown out and the regular feed is automatically engaged. At the end of the cut the tools are automatically withdrawn from the work, the carriage rapid traverses back to the starting point, and the motor shuts off.

The tailstock is of massive construction with built-in revolving spindle. All revolving shafts are mounted in anti-friction bearings. All moving parts are supplied with oil under pressure. The lathe swings 18 in. over the ways and weighs approximately 6000 pounds.

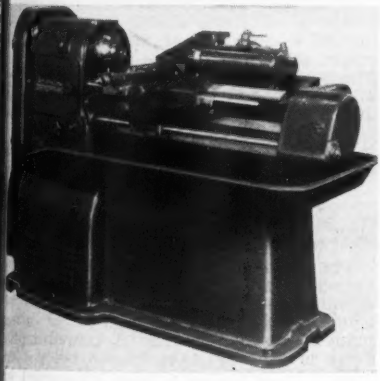
The Lo-Swing Model U Automatic Lathe is designed for turning pistons, bushings and other cylindrical work. It can be used either for straight turning or for forming or a combination of both. The machine is completely automatic in its operation. When the machine is started, it makes a complete cycle and stops with the carriage slides in the starting position. A single lever brings the tailstock center into position and starts the machine.

When equipped with individual motor drive, the motor is mounted in the

base. Both speeds and feeds are obtained through pick-off gears. All shafts, including the main spindle, operate in anti-friction bearings. Cams, gears and other parts of the mechanism in the head end of the machine are automatically lubricated under pressure. Carriage ways are equipped with hardened and ground steel plates. Longitudinal and cross feed movements of the carriage slide as well as the cross feed movement of the rear forming slide are obtained by means of hardened and ground cams. The Model U is built in two lengths; 12-in. and 36-in. centers, each size having a 5-in. swing.

The Lo-Swing Unitlathe is designed for maximum flexibility and maximum production. The machine is built on the unit principle, an integrally cast bed and headstock being mounted on a cabinet base which houses the motor, coolant tank and pump and forms the chip pan. Standardized and interchangeable units assembled into this base machine provide a complete and versatile lathe of the type required for the work at hand. Thus the machine may be economically converted to any type, up to and including full automatic.

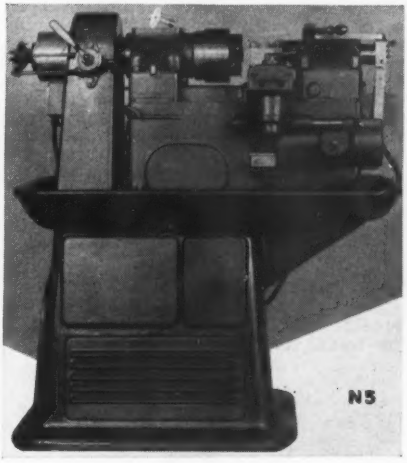
The Unitlathe applies the Lo-Swing method to the production of small and medium size work and provides for the



**Lo-Swing Unitlathe**

ultimate benefits and efficiency possible with carbide and other modern cutting tools.

The Lo-Swing Imp is designed to fill the need for a small, accurate lathe, heavy enough to make high spindle speeds practical. It is intended to handle work that is too small for the heavier automatic lathes, providing the rigidity, high speeds, and automatic operation which make an ideal machine for the manufacturer of bushings,




**Lo-Swing Imp Automatic Lathe**

pistons, valves, bearings and similar parts.

The spindle, which is large, is mounted on pre-loaded precision ball bearings and is capable of speeds up to 5000 r.p.m. Both spindle and feed mechanisms are driven direct through V-belts, assuring an extremely smooth cut. The carriage is driven by a drum cam mounted in the bed of the machine and operated by means of a worm and worm wheel. Variations in feed are obtained through pick-off gears. The cross feed is operated from a second path cut in the carriage feed cam, this design maintaining a positive time relation between the longitudinal and cross feeds. The Lo-Swing Imp is capable of a wide range of tooling possibilities and is adapted to either chucking or between-center work.

---

## The Henry & Wright Mfg. Co.

**Hartford, Conn.**

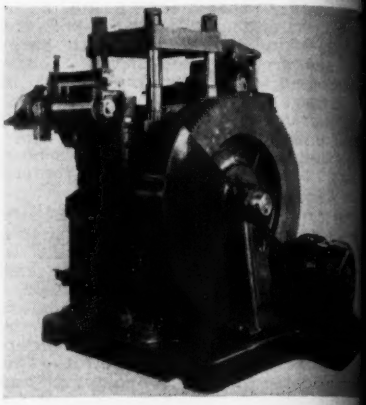
***Booth No. E-308, Exhibition Hall***

This firm will exhibit a 50-ton Henry & Wright Dieing Machine, No. 204½-38 Automatic Feed High Speed Steel Press and Automatic Motor Driven Cradle Type Stock Reel. Extensive exhibits of pro-

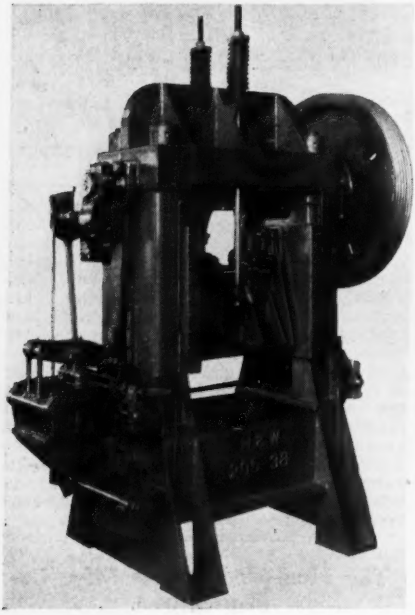
duction work processed on this equipment will also be shown.

The 50-ton Henry & Wright Dieing Machine is an automatic high speed power press equipped with automatic double roll feed arranged with direct connected motor drive and equipped with a heavy duty adjustable scrap cutter. Although this machine is of the same type as has been produced by this firm for a number of years, the machine exhibited embodies many recent improvements and differs decidedly from earlier models. The machine produces intricate stamped metal parts complete at each stroke of the machine while the machine is operating at high speed, thus combining several operations in one.

The guiding principle in this machine is unique. The angular thrust of the crankshaft is taken upon a crosshead in the lower base of the machine, this crosshead actuating an upper crosshead by means of four steel rods which are guided at the bed of the machine by adjustable taper bushings. Thus the punch carrying member is pulled down ward with a true vertical motion. T machine is equipped with a precis



Henry & Wright 50-Ton Dieing Machi



Henry & Wright No. 204½-38 Automatic Feed High Speed Steel Press

double roll feed. It has a capacity 50 tons, roll feeds handling material to 12 in. in width. The maximum fe pitch is 8⅝ inches.

The Henry & Wright 204½-38 Aut matic Feed High Speed Steel Press one of a new line of automatic, doubl crank, straight-sided tie rod type presse The press is of welded steel construction all welded units being normalized an annealed before machining. The up rights are hollow and are internall braced. Crown, bed and slide a amply proportioned to insure rigidity The press is equipped with an automati double roll feed of the type used o the dieing machine, also a scrap cutte The capacity of the machine is 80 ton

The Henry & Wright Automatic Moto Driven Cradle Type Stock Reel is a designed as to permit material to b dropped into a cradle instead of bein loaded upon a spindle. A geared moto drive is provided, the motor being con trolled by a mercury switch actuated b a balance arm resting upon the materia between the coil and the roll feed o the press. This control stops the moto before sufficient material is fed to allo the material to touch the floor, an starts the motor before the material i pulled tight between the press an the coil. Due to automatic contro and motor drive, the reel operates wit out attention from the machine o

# A 'TWO FISTED' VERTICAL GRINDER

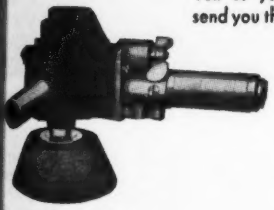
• • • that fits your grip like the hand of a friend... and doubles your manpower without raising your payroll.

THINK WHAT THIS TOOL WILL SAVE YOU ON GRINDING

- WELDS!
- CASTINGS!
- PIPE!
- STRUCTURAL SHAPES!

Grinding welds on metal doors this B-3 Vertical saved $1.50 a day . . . and paid for itself in three months.

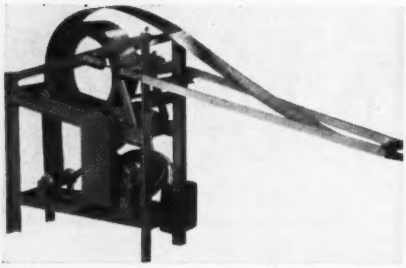
Tell us your work, and let us send you the proper tool for trial.



| Type | R.P.M. | Weight |
|---|---|---|
| B-1 | 3600<br>4750<br>5500 | 9¾ lbs. |
| B-3 | 3600<br>4750<br>5500 | 12½ lbs. |

• GRINDERS • BUFFERS • SANDERS • DRILLS •

THE ROTOR AIR TOOL CO. CLEVELAND, O.



**Henry & Wright Automatic Motor Driven Cradle Type Stock Reel**

erator. The reel exhibited will handle coils up to 500 lbs. in weight.

## Kearney & Trecker Corporation

**Milwaukee, Wis.**

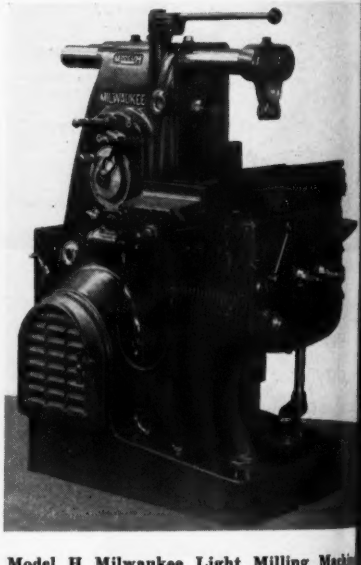
***Booth No. 400, North Annex***

The Kearney & Trecker exhibit will comprise a total of ten milling machines and one face milling grinder, all in operation demonstrating representative milling operations of a unique and interesting character. Practically every machine in the entire line of Milwaukee Knee and Column Type Milling Machines has either been redesigned or supplemented by entirely new models. Probably the greatest interest will center around the new No. O Size Model H. Manufacturing Knee Type Machine. These machines are small, the distance from the center of the spindle to the floor being only 3 ft. 8 in. They are designed primarily for the manufacture of small parts in large quantities.

The No. O Model H Machine has a 10-in. wide table and a feed range of 12-in. longitudinally, 3-in. transversely and 15-in. vertically. The machine is powered by a 1½-h.p., 1800 r.p.m motor, and is equipped with hydraulic controlled screw feed, automatic two-way cycle and automatic spindle stop. The power rapid traverse can be operated at either 150 or 300 in. per minute. Sixteen spindle speeds provide optional ranges of 20 to 800, 50 to 2000, or 60 to 2400 r.p.m. The machine is anti-friction bearing equipped throughout. There are 16 feeds obtained by pick-off gears providing ranges of either ¼ to 10 in., ½ to 20 in., or 1½ to 60 in. per minute.

To meet the requirements of light milling operations, both for manufacturing and toolroom service, a new line of No. 2 H Light Machines in Plain, Universal, and Vertical Types is shown. The machines are powered by 3-h.p. motors. Tables are 10 in. wide x 4[illegible] in. long and have the conventional No. [illegible] power feed range of 28-in. longitudina[illegible] 10-in. transverse and 17-in. vertic[illegible] movements. High speeds are characte[illegible] istic of the machines; 16 quick chan[illegible] speeds are provided with optional rang[illegible] of either 20 to 800 or 50 to 2000 r.p.[illegible] The 16 quick change feeds provide o[illegible] tional ranges of ¼ to 10 in., ½ to [illegible] in., or 1½ to 60 in. per minute. T[illegible] machines are equipped with No. 40 [illegible] tional Standard Spindles and are fu[illegible] nished with complete anti-friction bea[illegible] ing drive. The vertical model is of t[illegible] sliding head type with 4-in. vertical he[illegible] travel and 14-in. throat distance.

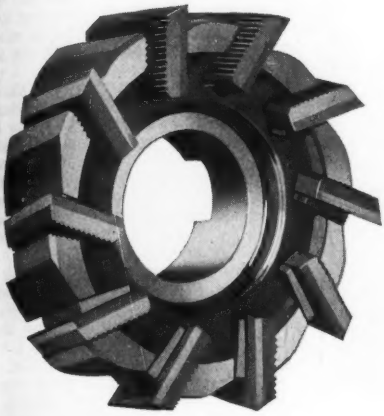
The "Milwaukee" line of model [illegible] High Speed Wide Range Knee Type M[illegible] chines has been entirely redesigned t[illegible] incorporate a number of new feature[illegible]



**Model H Milwaukee Light Milling Machi[illegible]**

the principle of which is the conve[illegible] ience of duplicate front and rear cont[illegible] for both hand adjustment and pow[illegible] feed operation. A positive interlo[illegible] makes it impossible to leave hand cra[illegible] attached when power feed is engaged.

The Model K has 24 spindle speeds [illegible] one continuous series in approxim[illegible] geometric progression. The speed desir[illegible] is selected by means of a single le[illegible] and large direct reading dial at the l[illegible]



GD & GD

**Inserted Milling Cutters made of the serrated blade and wedge construction positively hold the blades against slipping. This has been proven by the application of this construction to the heaviest class of milling over a period of eight years.**

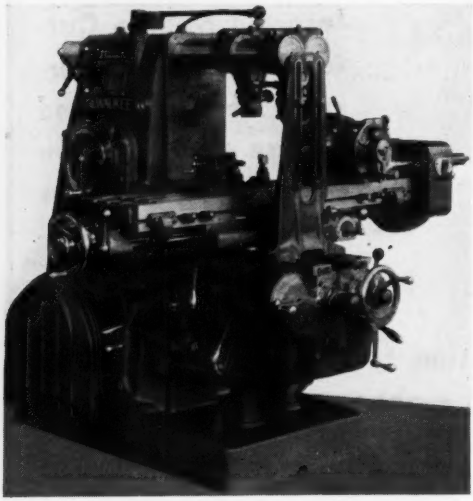
**As a further advantage the blades can be adjusted radially in increments of the pitch of the serrations (1/16") or axially to any position, the adjustments being entirely independent of each other. The supposedly correct ratio of adjustment of peripheral and side cutting edges of face mills is not predetermined by the manufacturer nor limited by mechanical construction.**

**GODDARD & GODDARD CO.**

**DETROIT, MICH.**

side of the column. The speed range is 100:1 ratio from 15 to 1500 r.p.m on both the No. 2 and No. 3 machines. The 32 feeds are also obtained by a single lever and direct reading dial. Feeds range from ½ in. to 60 in. per minute and can be changed while the spindle is revolving.

The worm and wormwheel drive for the spindle has been replaced with a spur gear drive with two gears on the spindle, each with wide face and coarse pitch and lapped until they are as quiet as worm gears.



**Model K High Speed Wide Range Knee Type Miller**

The motor is mounted crosswise of the column in order to provide a solid wall column back. Multiple V-belts transmit power from the motor to the initial shaft. The main clutch is now located on the outside of the drive pulley so as to be readily accessible. A chip disposal trough is provided at the rear of the knee top to eliminate piling up and wedging of chips. The start and stop push button control is now on the adjustable starting lever. Micrometer dials are of large diameter for easy reading and each is provided with a knurl locking nut for setting.

Included also in this exhibit is the super-precision Model K Hypoid Bevel Gear Dividing Head which has been designed for the most exacting work of toolroom and experimental laboratory. The head is built with pre-loaded anti-friction bearings and provides 5:1 qu indexing. For those whose work d not require such a wide range and v satility, a new Model H Dividing H of the worm and wormwheel type with 40:1 ratio is being shown for the fi time.

Several new attachments will also shown for Kearney & Trecker machin the principal of which is the New A tronomical Divider which makes possi the rapid selection of divisio from 2 to 1,296,000. It will div not only in minutes, but also in one-second of an arc—a divisi smaller than the millionth part a second. A right angle div attachment makes it possible set the dividing head crosswise the table. A new cam slide mak it possible to convert any Mod K Universal Machine into a com plete and efficient cam miller, a a new thread milling attachme makes possible the cutting straight or tapered threads on standard Universal Milling M chine.

One of the new Milwaukee T Mill grinders will be in operati at this booth, sharpening tungst carbide face mills, high speed ste and Stellite cutters from 3 to in. in diameter. An educational e hibit showing the steps requir in the manufacture of a tungst carbide face milling cutter will on display.

## The Producto Machine Company

**Bridgeport, Conn.**

***Booth No. 307A, North Annex***

***Booth No. A-301, Arena***

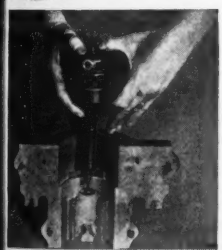
The No. 28 Producto-Matic Mill Machine included in this exhibit is t first of a new line of Producto-Ma Millers now being made by the abo firm. The machine is a manufacturi type of miller, designed to be adapta for miscellaneous milling operations any type of work. The machine prop is mounted on a cabinet base in wh are enclosed several mechanical feat such as the feed and speed mechanis Changes in feeds and speeds are m by the use of pick-off gears that are closed in a chamber access to which through a hinged door. A large cool reservoir is contained in the base of machine.

The work table is of extra length size to permit of long cuts. The ta is supported practically for its en

# I'LL PAY FOR MYSELF IN NO TIME

**The Dumore No. 8 Hand Grinder is usually called the "handiest tool in the shop"—it can be put to so many time and money saving uses. It is unequalled for finishing small openings, radii, and irregular shapes in all types of dies and molds . . . for correcting inaccuracies in blanking dies . . . providing top rake of a forming tool . . . touching up taps and cutters . . . sharpening dinking, button and acorn dies . . . lapping small holes . . . etc. etc.**

**The Dumore No 8 is high speed grinder, light in weight but powerful. It has a 1/40 h.p. universal motor, dynamically balanced for smoothness. An effective ventilating system makes continuous duty possible—a positive filter prevents the entrance of harmful dust. It's the kind of a tool that once you own it, you wonder how you ever got along without it. Write for folder "Hand Grinding the Modern Way."**



Correcting inaccuracies in a die with a Dumore No. 8-HG. Note the ease with which the grinder is handled.

A No. 8-HG finishing up a core box. This is one of hundreds of jobs it will do better—and more quickly.

**DO YOU KNOW**

that the Dumore Co. is one of the country's leading manufacturers of **PRECISION** built fractional h.p. (series wound) motors? Dumore engineers have had 22 years experience in designing and adapting power units.

**DUMORE**

The Dumore Co., Dept. 185-J
Racine, Wis.

Send me folder "Hand Grinding the Modern Way".

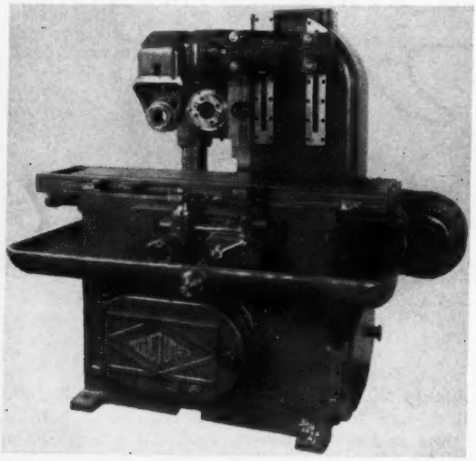
Name ..... Title.....

Firm .....

City..... State.....

Our Industrial Distributor Is.....

length. The quick traversing mechanism returns the table at a speed of 300 in. per minute. The range of table feed is from ⅜ to 12½ in. per minute under cut.



**No. 28 Producto-Matic Milling Machine**

The cutter spindle bearing is mounted on a heavy column upon which it is adjustable vertically to locate the cutters in relation to the work. Thus the adjustment is made in the cutter spindle bearing and not by elevating the table. This design makes it possible to support the table rigidly on a long bed. The cutter spindle bearing is driven by a worm and worm gear located close to the nose of the spindle.

The overhanging arm is designed so that it may be secured in two directions, providing added rigidity. The table is 53½ in. overall length, with 43½ in. of work surface 11 in. wide. Power is supplied by a three h. p. 1750 r. p. m. motor which drives the main driveshaft of the machine through a V-belt and pulley. The floor space required is 55x67 in. and the weight of the machine is 3300 pounds. The table is equipped with longitudinal power feed up to 30 inches.

## The New Britain-Gridley Machi Co.

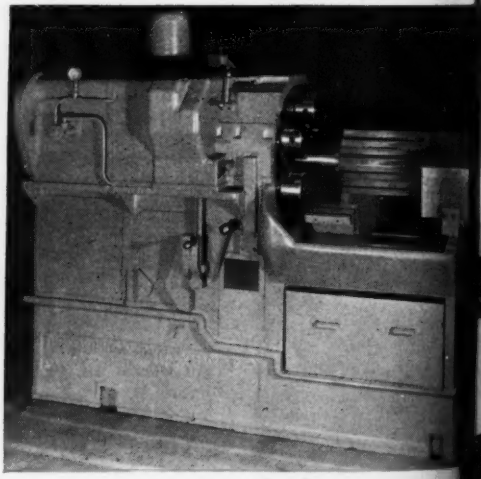
**New Britain, Conn.**

***Booth No. 909, North Annex***

Among the machines on exhi tion at this booth are two wh have not been shown before. T are the No. 16 Heavy Duty Spindle Work Rotating Type Chucking Machine and a No. Three Spindle Tool Rotating T Chucking Machine. The No. Machine is primarily designed boring, turning, facing and for ing operations on parts up to including 9 in. diameter.

The spindles of the No. 16 M chine are mounted on extra h preloaded, anti-friction bearin with all other high speed sha in the machine also mounted anti-friction bearings. The t slide is hexagonal in shape reciprocates on a hardened st stem which forms practically integral unit with the spindle c rier. The tool slide stem mounted at each end on n friction bearings.

The spindle carrier is automat ally lifted during the index mo ment, and is accurately loc and clamped after the index has been completed. The two form arms are extra heavy with large dia eter circular section bearings, righ



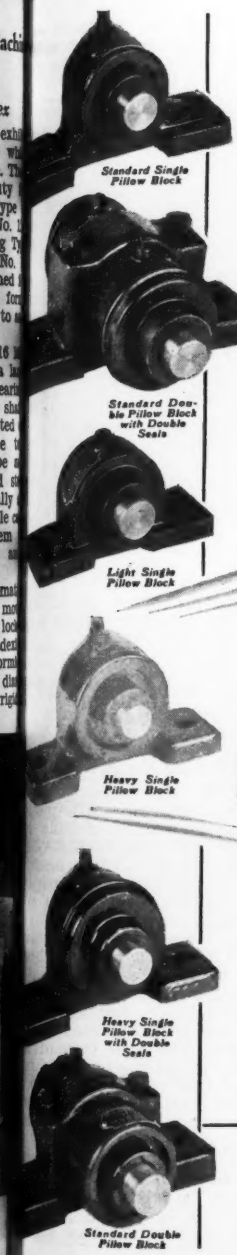
**New Britain No. 16 H. D. Six Spindle Work Rotating Chucking Machine**

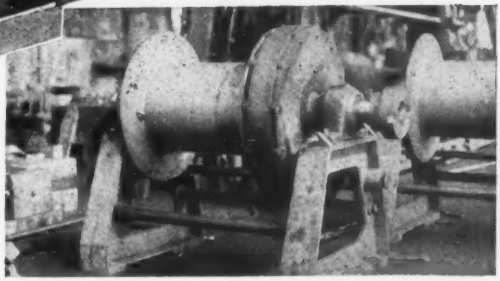
# The Havoc of Bearing Failure

# *banished by Fafnir*

It required 55 H.P to wind the ¾" cable on the five "Marine Legs" at this Prescott, Ontario, grain elevator. Bearing failures would raise such havoc that nothing less than 100% service could be countenanced . . . yet the reduction of friction was most important. Ball bearing pillow blocks offered an effective solution, and the drum shafts were therefore mounted on Fafnir Single Self-Aligning Units. Despite shaft speeds relatively high for this service, coupled with intermittent shock loads, this immense grain elevator can unload 160,000 bushels an hour without the slightest attention being given to the bearings.

This large granary is merely one more example of the right Fafnir in the right place. From "the most complete line of ball bearings in America" there is always *one* bearing that can best do a particular job. The ***right*** Fafnir will do almost more than any one other thing to save power transmission costs. Consult any Fafnir engineer or representative for complete details . . . and bear in mind that unvarying high quality is a proven fact with Fafnirs . . . THE FAFNIR BEARING COMPANY. *New Britain, Connecticut.* Atlanta . . . Chicago . . . Cleveland . . . Dallas . . . Detroit . . . Milwaukee . . . Minneapolis . . . New York . . . Philadelphia


Standard Single Pillow Block
Standard Double Pillow Block with Double Seals
Light Single Pillow Block
Heavy Single Pillow Block
Heavy Single Pillow Block with Double Seals
Standard Double Pillow Block



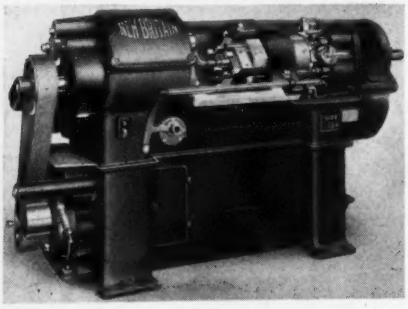
WORTHWHILE *economies in design and production are given in every issue of Fafnir's house organ, "THE DRAGON". We will gladly add your name to the mailing list.*

**FAFNIR**
**BALL BEARINGS**

supported and actuated by individual cams. Extra cross arms may be mounted, when required, at two additional positions. The chucks, which are 9 in. in diameter, can be of the 2- or 3-jaw type or special work fixtures to suit individual jobs. The chucks or work fixtures are hydraulically operated by a mechanism built into the machine and can be opened in any position at the will of the operator. The regular chucking pressure is adjustable from 50 to 250 lbs. to suit requirements.

The No. 12A Machine represents the continued development of the tool rotating type of machine which is a standard product of the New Britain-Gridley Machine Co. The improved model offers the rigidity, spindle speeds, and accuracy necessary to properly utilize the modern cutting speeds and material. Spindles are equipped with individual speeds and feeds so that the correct cutting speed and feed may be secured for each tool.

A turret clamping device is automatically released during the indexing period reducing friction to the minimum during the index cycle. Quick acting two-jaw chucks or special work fixtures eliminate chucking as a factor in production output. The machine is ideally adapted for the finishing of

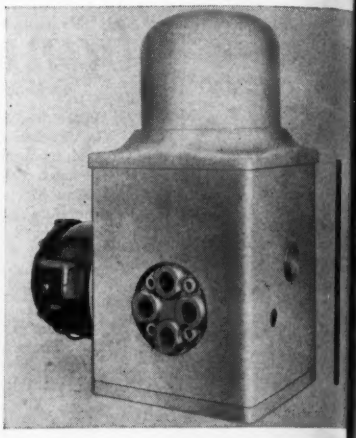


**New Britain No. 12A Three Spindle Tool Rotating Type Chucking Machine**

small brass parts from castings or forgings. The speed range makes the machine equally efficient on all types of material.

The New Britain No. 202 Hydraulic Unit is also on exhibition at Booth No. 909. This unit is a compact, dependable device for hydraulically operating chucks or work fixtures on any type of machine.

A constant speed fractional h. p. motor builds up a reserve pressure against an air cushion in an accumulator. Chucking pressures are instantly a justable to any pressure desired with a range of from 50 to 300 lbs. The u



**New Britain No. 202 Hydraulic Unit**

is available for application to all ty of old or new machines requiring po operated chucking equipment.

## Ex-Cell-O Aircraft & Tool Corporation

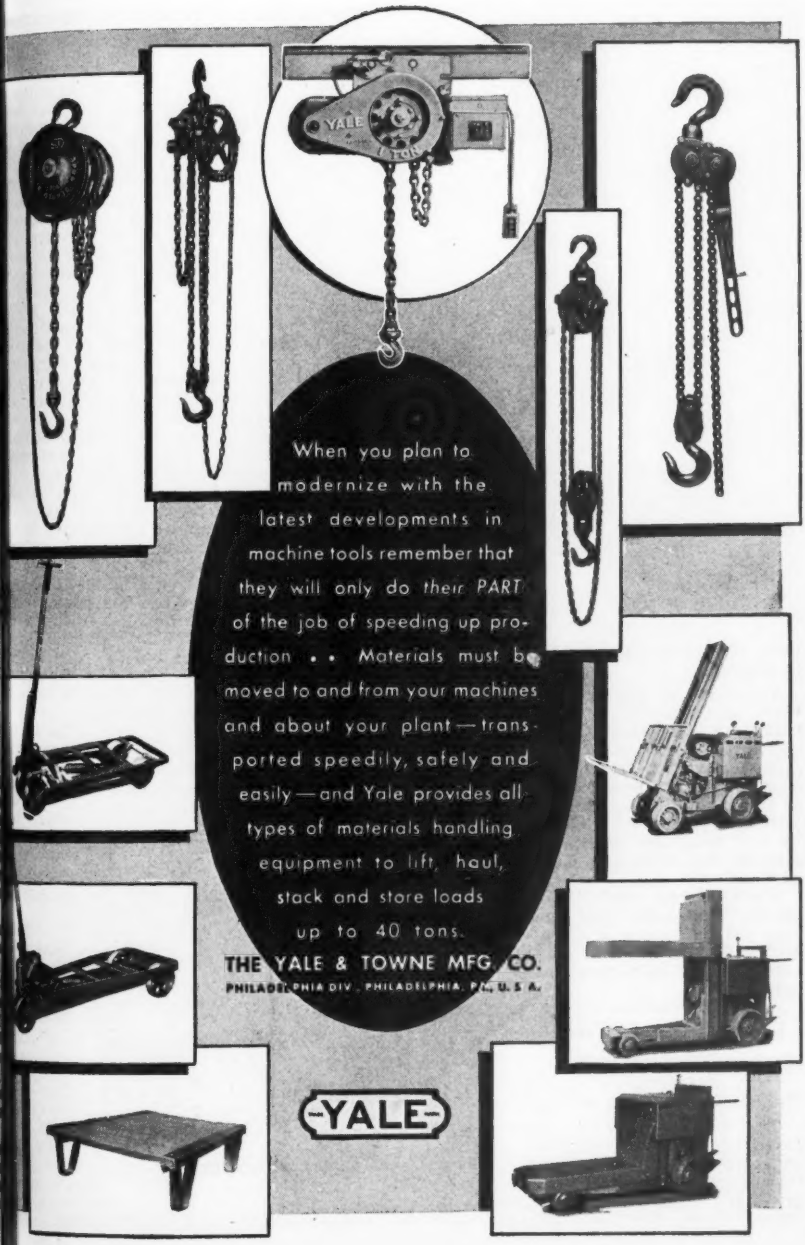
**Detroit, Mich.**

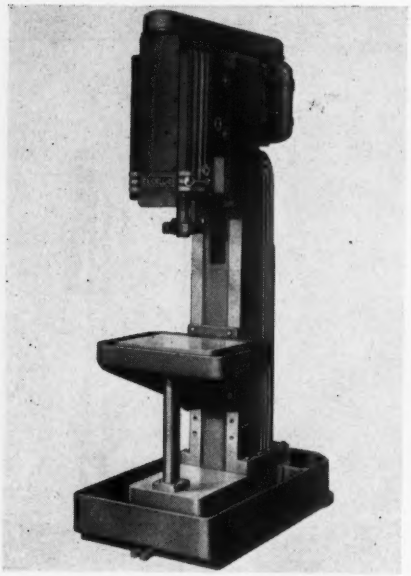
***Booth No. 812, North Annex***

The exhibit of the above firm cludes a new vertical single-pur heavy-duty manufacturing drilling chine equipped with an Ex-Cell-O draulic Power Unit. This mach shown in the illustration, is part larly adapted for high production m tiple operations.

A Hydraulic Power Unit with ma mum stroke of either 3 or 10 inche available and can easily be adjusted meet the specific requirements of particular operation. Rapid trav feeds, reverse and stop are controlled adjustable dogs. The two forward rates are independently adjustable f the outside of the unit. A 2, 3, 5 7½ h. p. motor can be furnished the unit depending on requirement

A flange is located on the end of quill for mounting multiple sp heads. An accurately ground hol provided in the spindle nose and h driving keyway. A machined pad l cated on each side of the base and


When you plan to modernize with the latest developments in machine tools remember that they will only do *their PART* of the job of speeding up production . . Materials must be moved to and from your machines and about your plant — transported speedily, safely and easily — and Yale provides all types of materials handling equipment to lift, haul, stack and store loads up to 40 tons.
THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIV., PHILADELPHIA, PA., U. S. A.
YALE



Ex-Cell-O Hydraulic Drilling Machine

unit for mounting guide bar brackets if required.

The table of the machine is furnished with adjustments in 3-in. steps which provide the necessary table heights. On applications where coolant is required, a vertical motor-driven centrifugal pump is mounted at the back and at the base of the machine column. A coolant compartment is located in the base of the machine with suitable screens for removing the dirt and chips.

Push button control for operating the electrical motors and the operating lever on the hydraulic power unit are located within easy reach of the operator.

## The Porter-Cable Machine Co.

**Syracuse, N. Y.**

***Booth No. 307C, North Annex***

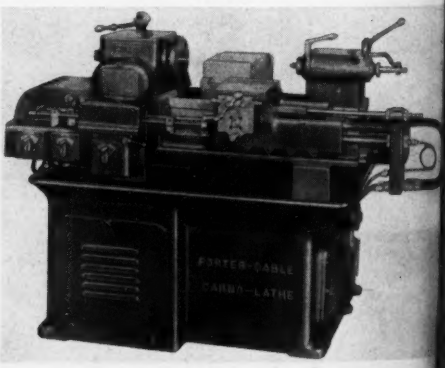
The Carbo Hydraulic Lathe, featured in this display, is Porter-Cable's newest offer to manufacturers of duplicate parts in small and medium sizes. Being a full automatic "cycle" lathe, it enables one operator to operate two or more machines.

The new Carbo Hydraulic Lathe retains all the features for which it has been known heretofore and in addition is equipped with a hydraulic power feed which provides smooth, even movement of the tool and an infinite variety of feeds from 0 to 24 in. per minute. The hydraulic-actuated feed prolongs the life of the tools, makes possible the most productive feed and instantaneous change from one feed to another, and provides for the production of duplicate parts within very close limits, due to the positively accurate setting of the tool slides at the start of each cycle.

An important production feature is the hydraulic power feed to the cross slide of the front carriage. Any tool slide can be operated independently of the other, providing flexibility of set up. The automatic cycle reduces loading time and eliminates a couple of manual operation, increasing production. Spindle speeds are 95 to 1130 r.p.m. with the low speed head or 167 to 1978 with the high speed head and an 1800-r.p.m. motor. Other spindle speeds may be obtained through using slower speed motors.

The lathe is 18 in. between centers and swings 14 in. over the ways. Rapid return is 15 ft. per min. but can be reduced to 3 ft. per min. Hydraulic feed and individual control is provided for each tool slide. The motor capacity is up to 10 h. p. and the motor is mounted in the base of the machine.

Any desired feed from 0 to 24 in. per minute is available. The permissible travel of the back-facing attachment is 5 inches. The clutch is the single plate dry type.




Porter-Cable Carbo Hydraulic Lathe

EVIDENCE of these facts keeps accumulating. Specific records prove that Victor "Moly" hack saw blades can do more work per blade and per dollar than any other blade on the market, that they cut cleaner and faster, that lighter feed can be applied at no lessening of cutting speed, and that breakage can be made negligible. The materials on which these records have been made include the toughest and hardest steels and alloys, all sorts of shapes, thick and thin sections.

The tungsten-content, molybdenum-steel of which Victor blades are made, and the special heat treatment they receive sets them apart from and above anything else you have ever tried. A trial order and you will know for yourself.

Write us about your most difficult or expensive hand or power hack saw jobs, give us the name of your supply house and we will see that a type of "Moly" blade is recommended that will give you more production at one-third less cost.

Victor
HAND POWER
"Moly", the original Molybdenum heavy duty — extra value
HACK SAW BLADE

ONLY THE ORIGINAL MOLYBDENUM HACK SAW BLADES ARE STAMPED: "MOLY"

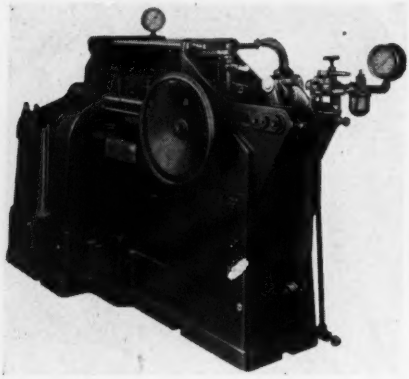
NRA VICTOR SAW WORKS, INC. Middletown, N. Y.

## Madison-Kipp Corporation

**Madison, Wis.**

***Booth No. E-208, Exhibition Hall***

At this booth, on view for the first time, is the new Madison-Kipp Model No. 6 Die Casting Machine. This machine is intermediate in size, being neither as small as the Kippcasters nor as large as the Madison-Kipp Automatic Die Casting Machines.



**Madison-Kipp No. 6 Die Casting Machine**

The No. 6 Machine will handle all standard die casting alloys in zinc, aluminum, lead or tin. An air pressure gooseneck is standard equipment, but a plunger type gooseneck may be applied when specified. The effective capacity of the standard air gooseneck is 5 lbs. in zinc alloy. The metal pot capacity is 300 lbs. in zinc alloy. The standard, patented Madison-Kipp Automatic Core Pulling Mechanism may be applied to this machine so that all cores will be placed and withdrawn as the dies open and close. Ejection of the casting is automatic with the opening of the dies.

As a safety feature, the machine is designed so that the metal cannot be shot into the die until the die halves are closed and locked in position. A hand wheel is provided for die setting and for auxiliary hand operation whenever this becomes necessary; otherwise the entire machine is operated by power. All parts of the machine are easily accessible and designed to withstand strains far beyond those experienced in normal operation.

The No. 6 Machine retains many of the features which characterize all Madison-Kipp Die Casting Machines in addition to many new features which have been added such as the Geneva Movement for quickly moving the complete furnace assembly and for changing pot and goosenecks when a change in metal specifications is necessary. The machine is 99 in. long by 35 in. wide and 52 in. high. The width between the elevator push rod centers is 14 in. and the height of the stationary support or hot plate is 16¾ in. Weight, 3500 pounds.

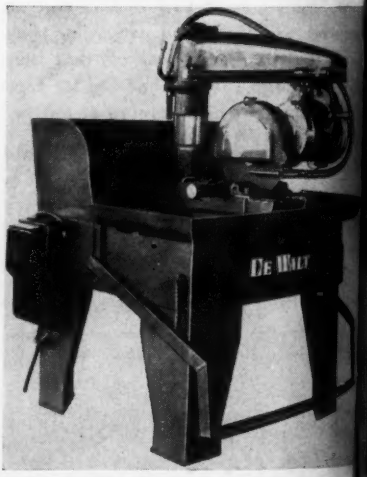
## DeWalt Products Corporation

**Lancaster, Pa.**

***Booth No. A403, Arena***

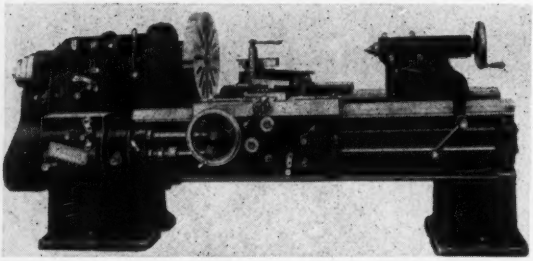
Among the machines for cutting all kinds of materials which will comprise this exhibit, is a new metal-cutting machine built to use either a saw blade or abrasive wheel, depending upon the metal to be cut. The cutting medium is driven direct from the motor shaft or back gear and provides two speeds. The machine is built in several sizes with motors up to 20 h. p. and will cut either steel tubes, shapes, angles or flat stock up to ½ in. thick, using the saw blade, or steels and alloys up to 3 in. thick an abrasive wheel.

The machine is equipped with either a foot-operated vise or with hand or air operated vise as desired. Either hand feed or automatic feed is available, and the machine can be equipped for coolant. The manufacturer states that the machine is so designed that the material is not distorted by the cutting process. Cuts can be taken at any angle or parallel to the table.




**DeWalt Metal Cutting Machine**

OUTSTANDING
NICHOLSON
U.S.A.
MADE IN U.S.A.
Nicholson Files are outstanding for the sharpness of their teeth; for their durability and for their ability to remove the greatest amount of metal in the shortest time. One reason why Nicholson Files are outstanding is the experience of the men who make them. Because of the tremendous runs in the Nicholson File Factory each file expert has done his specialized work far more frequently than would otherwise be possible.
At hardware wholesalers and mill supply dealers. Nicholson File Company, Providence, Rhode Island, U. S. A.
Genuine
NICHOLSON
FILES
A FILE FOR EVERY PURPOSE



Cincinnati 22-In. Geared Head Heavy Duty Lathe

## The Cincinnati Lathe & Tool Co.

**Cincinnati, Ohio**

***Booth No. 11, North Hall***

Among the lathes that will be on display at this booth will be two of new design; an 18 in. by 8 ft. Cincinnati Tool Room Lathe and a 22 in. by 10 ft. Cincinnati Geared Head Heavy Duty Lathe. The lathes are of the same general design, excepting for a few special features. The Tool Room Lathe has the motor mounted inside of the leg and the machine is fitted with oil pan, pump and both taper and nose type draw-in attachments. This machine is fitted with anti-friction bearings, not only in the headstock but also in the quick change gear box and apron unit. The 22-in. Heavy Duty Lathe will be fitted with a special double rest permitting a series of cuts to be taken simultaneously with a gang of cutting tools.

The beds of these lathes are of 80 per cent steel with one per cent nickel, providing a strength and wearing surface that will withstand the severest strains under the most unusual conditions. The beds are reinforced with heavy cross girths approximately 15 in. apart.

Twelve spindle speeds are available in geometric progression by simply shifting three levers. The speed required, from lowest to highest, is obtained direct. The quick change gear box, which is fitted as a unit to the front of the lathe, provides from 32 to 96 changes with which any thread or feed desired may be obtained by shifting two levers.

The clutch is of the compression disc type, operated by a lever on the apron on top of the headstock. Moving the lever starts or stops the lathe at once, the design of the clutch being such as to avoid drifting and accidental starting when not in use. This feature is said to be exclusive. Automatic force feed lubrication is supplied for the quick change gears, spindle bearings, bed, carriage, apron, and compound rest. One of the most important characteristics of the Cincinnati Lathe is the plunger for locking the spindle when removing the chuck or face plate. The use of the plunger precludes the possibility of strain on the gears and shaft in the headstock and thus preserves accuracy.

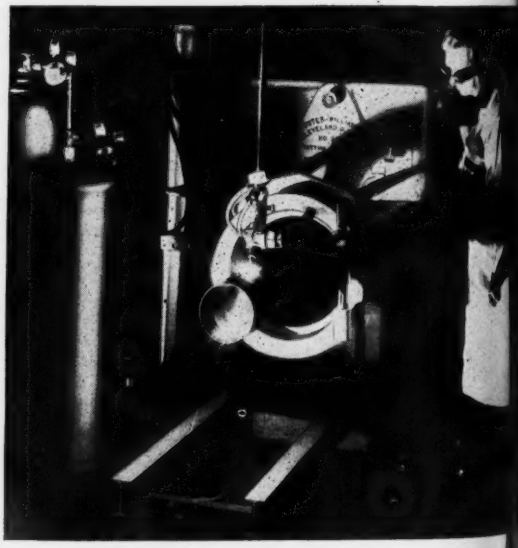
---

## Oster Manufacturing Company

**Cleveland, Ohio**

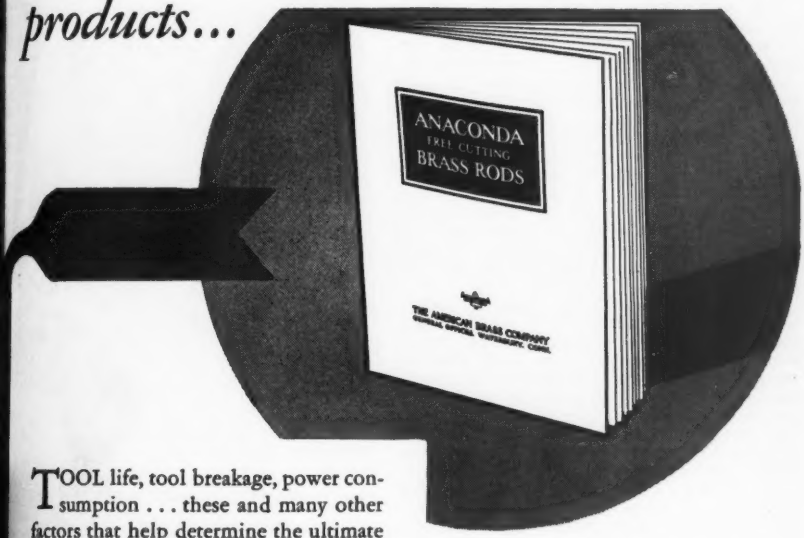
***Booth No. 7, North Hall***

An interesting item of this exhibit is the Oster-Williams No. 212 Machine for cutting pipe intersections to prepare



Oster-Williams No. 212 Pipe-Cutting Machine

# 20 *Proved Advantages of* BRASS ROD *for screw machine products...*




TOOL life, tool breakage, power consumption . . . these and many other factors that help determine the ultimate cost of screw machine products are discussed in our *new* 20-page booklet.

In addition to Brass, Anaconda Free Cutting Phosphor Bronze, Nickel Silver, Everdur, and other Anaconda Free Cutting Alloys are also described.

If you make, sell, buy or use screw-machine parts of *any metal,* you'll want this booklet. For your copy, mail the coupon today.

**THE AMERICAN BRASS CO.**
General Offices: Waterbury, Connecticut
*Offices and Agencies in Principal Cities*

ANACONDA
from mine to consumer

*Mail the Coupon*

The American Brass Co. Waterbury, Conn. MMS9

Please send me a *free* copy of your new Brass Rod Booklet, Anaconda Publication B-14, by return mail.

Name ..... Title .....

Company .....

City ..... State .....

pipe welding. Pipe welding is an accepted practice. However, an acceptable job demands very largely upon correct preparation of the pipe for the weld. This preparation usually consists of beveling the end of a pipe and cutting and beveling the hole to size and shape in the side of the pipe so that the two pieces when fitted together will make a tight joint and can be properly welded.

The Oster-Williams No. 212 Machine duplicates in design any pattern for any kind of a pipe welding job without the use of cams, templates, or special fixtures, and the finished surface is said to have the appearance of a lathe tool cut.

The cutting torch is accurately guided by an ingenious mechanism which duplicates the motion of a torch held in the operator's hand. It will cut any size of pipe from 2½ to 12 in., making full size tees or reducing tees 90 degs., branch reducing tees 45 to 90 degs., elbows, miters, Y's and blunt bull plugs, as well as hole cutting.

The generating case is made of aluminum and is mounted on a rotating column which can be swung in any direction. The pipe rests on ball bearing rollers housed in adjustable supports resting on double rails mounted on the welded steel base of the machine. If the end of the pipe is to be cut off for welding, then the pipe is placed through the aluminum torch carrier ring. If a hole is to be cut in the side of the pipe, the torch carrier ring is swung around until it reaches the side of the pipe. No templates are needed, nor does the job have to be laid out.

## Hobart Brothers Company

**Troy, Ohio**

***Booth No. E-103, Exhibition Hall***

Among the several types and sizes of electric arc welders included in this exhibit is a new 75 Ampere Arc Welder which is being shown for the first time. The machine is designed particularly for the welding of light gage sheet metal which has been impractical for welding purposes heretofore. The machine has a welding range of from 15 to 125 amperes and welds with 1/16, 3/32, or with 1/8-in. electrodes and on metal as light as 24 gage, which is 0.025 in. thick.

The machine is portable and provided with a lifting eye for use with a hoist. The steel truck with four disc wheels and drawbar make it easy to move about. The machine is of all arc welded steel construction and is compact and sturdy. The motor, generator, exciter, and cooling fan are mounted on a single horizontal heavy duty shaft which mounted in ball bearings. The Hob oversize, four-brush exciter provides t advantages of separate excitation, i suring prompt building up and exce tionally quick recovery of the arc.

Remote control gives the opera

**Hobart 75 Ampere Arc Welder**

finger tip control of the current for fi adjustment at the work, no matter ho far away from the welding machine may be working. The polarity swit makes available either straight or r verse polarity without necessity changing cables.

## Allis-Chalmers Manufacturing Company

**Milwaukee, Wis.**

***Booth No. E-401, Exhibition Hall***

The Texrope Drive and Motor sectio of this display includes a new Va Pitch Sheave which is designed to pr vide for variable speeds with Texro drive. Vari-Pitch Sheaves have pit diameter adjustment to vary speeds fro between 15 to 25 per cent with o sheave; with both sheaves of the Va Pitch type, the speed range is double

Vari-Pitch Sheaves are made in t multi-groove types, one adjustable wh the drive is stationary and the oth for speed control when the sheaves a in motion. Standard Texrope belts a used with both sheaves.

# ..OIL saves the Profit!

***Cost Cards Prove Socony-Vacuum Cutting and Soluble Oils Save Money in Time and Tool Changes***

NEW STEELS . . . new alloys . . . new tolerance and finish requirements—progress brings new problems to your shop.

Socony-Vacuum Engineers have analyzed the machining problems of shops . . . large and small . . . all over the country. They have shown where savings could be made . . . in many cases of amazing proportion.

And here is an important fact:

*The demand for Socony-Vacuum Soluble and Cutting Oils has doubled in the past year* . . . proof of the aid these oils and Socony-Vacuum experience are giving manufacturers.

Would savings like this interest you?—

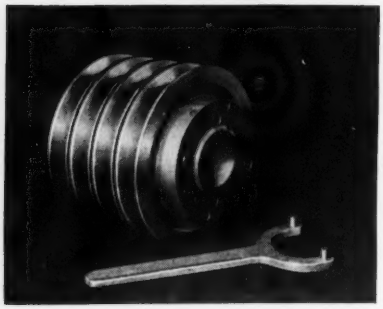
A Wisconsin manufacturer is machining SAE 1112 steel on Cone Automatics. When Socony-Vacuum Sultran Cutting Oil No. 00 replaced a competitive oil, the maximum number of pieces per grind increased from 800 to 2177. An increase of 172 per cent!

Such economies are worth investigating!

OIL COMPANY, INC.

VISION · LUBRITE DIVISION · WHITE EAGLE DIVISION ·
OMPANY · GENERAL PETROLEUM CORP. OF CALIFORNIA

GARGOYLE
Lubricants



**Allis-Chalmers Vari-Pitch Sheave for Texrope Drive**

A full line of motors for various machine tool applications are on display, particularly the Allis-Chalmers "Seal-Clad" squirrel-cage motor featuring Bakelite shields for protecting windings.

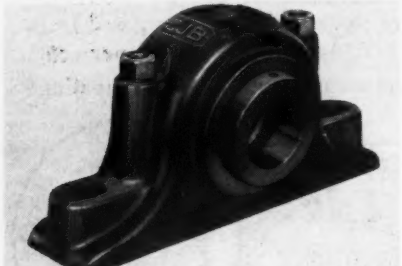
## Ahlberg Bearing Company

**Chicago, Ill.**

***Booth No. E-301, Exhibition Hall***

In addition to their complete line of bearings and housings, the Ahlberg Bearing Company will have on display for the first time their newly-developed line of "CJB" Pillow Blocks. The new block is said to offer many new and unique features which make it competent to meet the requirements of modern high speeds and heavy duty service.

The block is available in the Unit Type, for normal and medium duty, and the Ball and Socket Type for standard and heavy duty, thus providing two distinct types in addition to the present light duty type. Thus a selection of 9



**Ahlberg "CJB" Pillow Block**

capacities for a given shaft size is available, with four additional capacities for metric measurements.

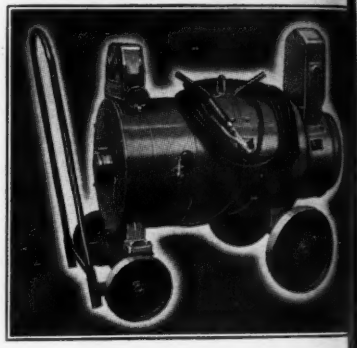
All types are fitted with felt seals prevent entrance of foreign matter to retain lubricant. In addition, Medium and Heavy Duty types equipped with a labyrinth closure ob ating the necessity of special closur Standard and Heavy Types are ma with a ball and socket housing whi permits the installation of a heavy du rigid type double row ball bearing a includes features which compensate variations in alignment of shafting.

## Harnischfeger Corporation

**Milwaukee, Wis.**

***Booth No. E-504, Exhibition Hall***

One of the features of this exhibit the line of Heavy Duty Arc Weldi Machines now being made by this fir Recent refinements in the design of t machines include a new, oversize tw bearing armature shaft, removable ba



**Harnischfeger 200-Amp. H. D. Arc Weld**

bearing capsules, simplified single cu rent control, dust-proof calibration pla heavy duty built-in polarity switch, an drip-proof housings.

The new 200-amp. machine, illustrate herewith, retains the previous P & generator design with the internal sta bilizer coils imbedded in the main po tips, unique short circuit winding an magnetic bridge which broaden th welding range and improve the uniform ity of the current.

Motors are built with solid cast fram with top opening for terminal leads an mounting of the magnetic switch-ty starter. It is equipped with no-volta release and overload protection. Connec tions are suitable for standard or speci voltages of 2 and 3-phase, 60 and cycle current.

# NEW NEW NEW KNURLED "UNBRAKO"

## Socket Head Cap Screw

●

**Order by Name; Specify:**

**The "Knurled Unbrako"**

U. S. and Foreign Pats. Pending

**THE KNURLED "UNBRAKO"**

Every mechanic, when driving screws, will invariably persevere with his fingers until he has to give up—but not before.

With the Knurled "Unbrako" he can drive much further and faster because his fingers actually become geared to the Knurled head.

**Old Smooth-Head**

Fingers Slip and Slide.
Hard and Slow to Drive.

MANUFACTURED BY

**STANDARD PRESSED STEEL CO.**

Box 555 JENKINTOWN, PA.

# New Shop Equipment

## G-K Timken Equipped Geared Head Engine Lathe

Greaves-Klusman Tool Co., Cincinnati, Ohio, has brought out a Timken-Equipped Geared Head Engine Lathe, designed to render the maximum of service on a wide range of work over a long period of time. The bed is reinforced with a rear extension and reinforcement has been adapted to the carriage. The apron is of double plate box form with a central oil reservoir and the feed rod and lead screw are supported at both ends of the apron. All gears in the apron are of steel and transmission gears are heat treated and hardened. Dual lever control is a feature of the machine.

The ways of the bed are chilled to minimize the effect of wear. Heavy ribbing which extends the full length of the bed reduces twisting and bending strains to the minimum. The bed extension is back of the front end to act as a support between the headstock and front cabinet leg.

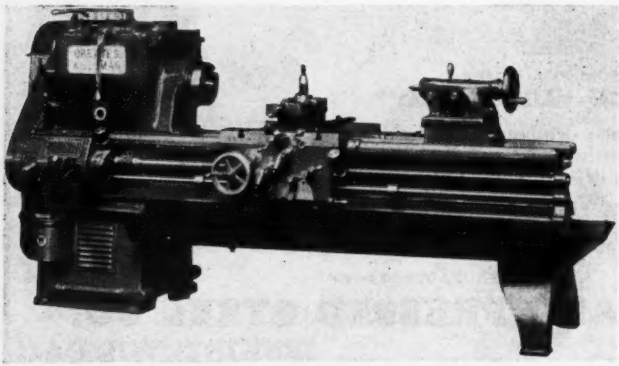
The headstock is heavy with internal bracing in both directions and is rigidly bolted to the bed, insuring permanent alignment of the headstock with the carriage and tailstock. The spindle is made from a solid high carbon forging. A feature of the machine is the new form of nose, and also the bearings. The small diameter is ground standard, allowing the operator to easily slip on face plates or chucks, relieving him of the strain of supporting the weights while engag the threads. The threaded diameter much larger than the pilot diame providing an extra large shoulder a for squaring the face plates.

A sliding gear transmission is used

View Showing Bearings and Gears in Head

the gear head, a single lever disengaging the friction and relieving the gear of all strain while the other two lev slide the gears into selected positions the 12 speeds. A splash oiling lub cation system is used.

The machine is made in four sizes: in. x 6 ft., 18 in x 6 ft., 20 in. x 8 and 22 in. x 8 ft. The swing over t ways varies fr 18½ in. on t smallest size 25½ in. on t largest size. T two smaller si will take 30 in. b tween the cent and the two lar sizes 48 in. T thread range from 2 to 56 on t two smaller si and from 1 to on the two lar sizes. The fe range on the t smaller sizes 0.0061 to 0.188 and on the lar sizes, 0.0033 0.185 in. T



G. K. Timken-Equipped Geared Head Engine Lathe

weight, crated, varies from 3600 to 7800 lbs. according to size.

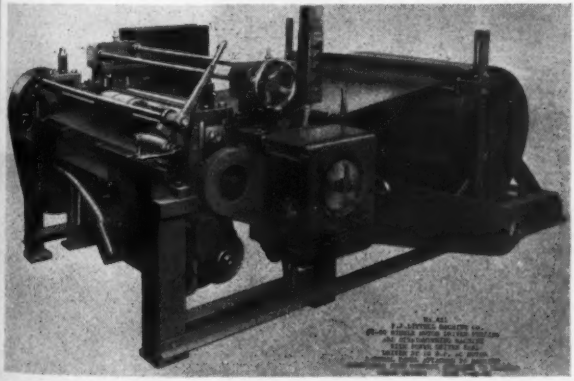
## Littell Feeding and Straightening Machine for Coiled Stock

In view of the increase in the use of coiled sheet stock for making large blanks, due to the saving involved, the F. J. Littell Machine Company, 4127 Ravenswood Ave., Chicago, Ill., has brought out a motor-driven feeding and straightening machine complete with reel for feeding this wide stock. Any length of feed can be obtained and feed changes can be made in a few minutes. The unit is portable, the control panel being mounted on the machine as well as the device for measuring the various feeding lengths.

The only interconnection of the feeding unit with the press is electrical. When the press has cut a blank and the press ram starts to rise, the feeding unit automatically starts and feeds the stock forward the correct amount through the operation of a five-roll power-driven stock straightener. The machine is provided with a hand starting button, a stopping button, button for inching forward, and a button for inching back, so that the stock is always under control.

The illustration shows a machine for handling stock 48 in. wide x 0.040 in. thick in coils weighing up to 5,000 lbs. The measuring device, by which the operator obtains any length of feed desired by turning a handwheel, is shown at the front center of the machine.

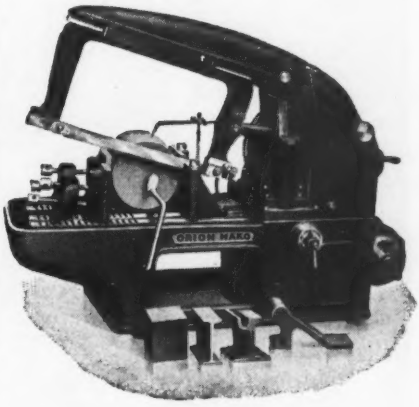
This unit can be moved by means of a crane to any press where the blanking is to be done.



**Littell Feeding and Straightening Machine for Coiled Stock**

## Orion Hydraulically Controlled Power Hack Saw

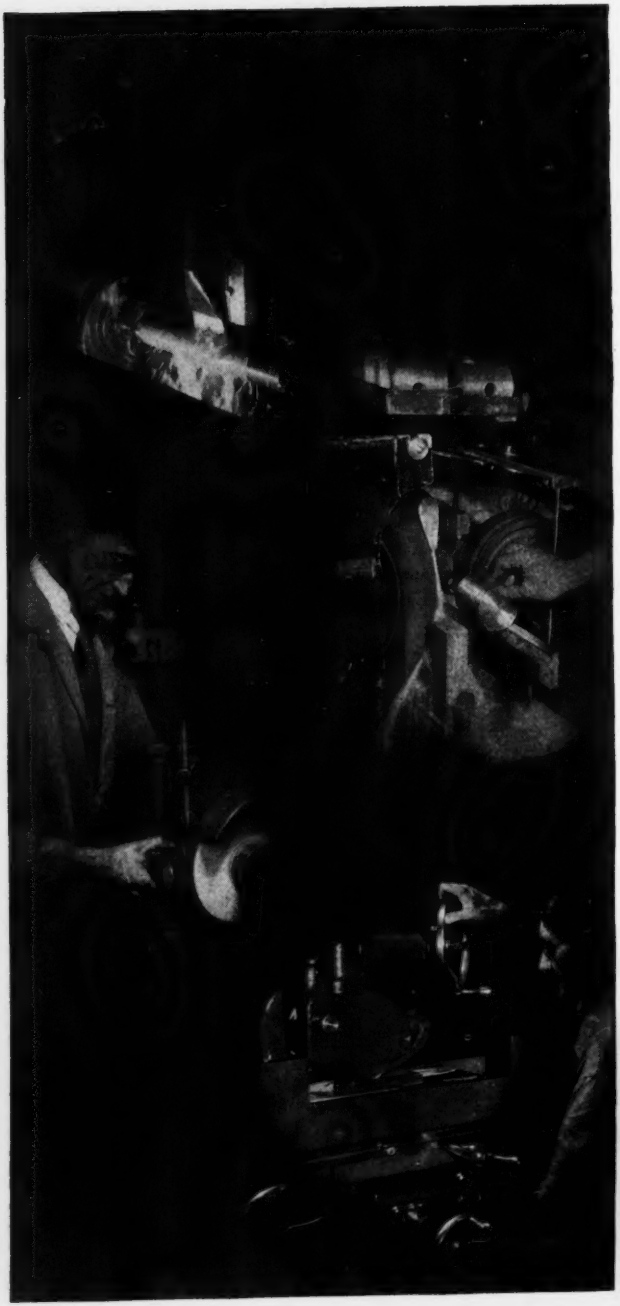
Marburg Brothers, Inc., 90 West Street, New York, N. Y.. is now marketing the Orion Hydraulically Controlled Power Hack Saw shown in the illustration.




**Orion High Speed Heavy Duty Hack Sawing Machine**

This machine is designed to combine the features of stability with extreme precision and simplicity of construction. The machine is built in five standard sizes covering a range of work diameters from 4 in. to 16 inches.

The machine bed is of box pattern and is provided with a gutter for cutting fluid. The vise can be shifted lengthwise to permit the full length of saw blade to be used, and can also be swiveled to 45 degs. Due to the application of hydraulic power, the tooth pressure is continually adjusted according to the hardness and nature of the material to be cut, insuring a high cutting capacity and minimum wear of blades. The feed pressure is automatically lessened when finishing the cut and as the saw breaks through the material it automatically reverses to



# For Man E
# from YNew

## IOR

ODE
exec
cefully
Clevel
achine

e new
oductio
mufact
g oper

enabl
operat
kers,

variet
ented
rtant
inding
u—do
ur g

FIFTIETH
NORTON
YEAR
1885-1935

# Efficiency
# New Grinders . . .

## NORTON GRINDING WHEELS

MODERNIZATION is in the minds of production men and executives in every metal working plant today—brought ...efully to their attention by the gigantic Machine Tool Show ... Cleveland—the greatest assemblage of modern, cost-cutting ...achine tools ever brought together.

...e new grinders exhibited include machines for all kinds of ...oduction, precision work—they represent the efforts of many ...nufacturers to provide you with equipment to do your grind... operations better, faster and more economically.

... enable these new grinders to do their best work for you—... operate with all the efficiency designed into them by their ...kers, there is a complete line of Norton Grinding Wheels.

... variety of Norton abrasives, a variety of bonds and the ...tented controlled structure process of manufacture are im...rtant reasons why you can get Norton Wheels with the right ...inding action for any job. Norton service is available to ...u—don't hesitate to use it to obtain maximum results from ...ur grinders.

**NORTON COMPANY, WORCESTER, MASS.**

New York Chicago Detroit Philadelphia Pittsburgh
Hartford Cleveland Hamilton, Ont. London Paris
Wesseling, Germany

W-519

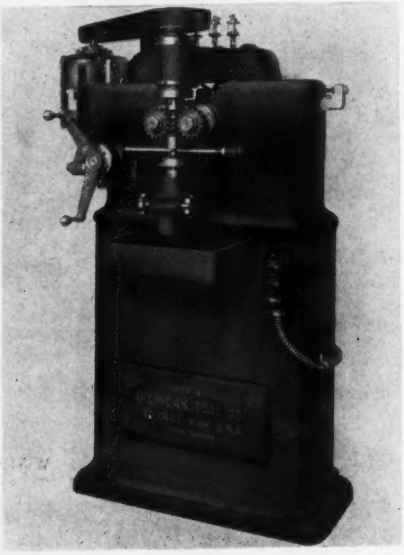
the starting position and the clutch is automatically disengaged.

Standard drive for the machine includes a two-stepped single pulley and friction clutch; however, when direct motor drive is used, the speed of the drive is doubled so that simple and inexpensive motors of 1500 r. p. m. can be used.

A pump driven from the driving shaft of the machine supplies an ample flow of coolant. Overflow is prevented however; thus the machine and floor remain dry. Standard equipment includes box, gear guard, all necessary wrenches an adjustable work stop, chip collector and belt for coolant pump, and six high speed saw blades.

## Michigan Tool Steering Gear Worm Lapper

A lapping machine for finishing steering gear worms has been introduced by



**Michigan Tool Steering Gear Worm Lapping Machine**

the Michigan Tool Company, 7175 Six Mile Road E., Detroit, Michigan. Features of the machine include automatic timing, variable for each side of the thread, adjustable center distances allowing recutting of laps, two lap spindles with an adjustable hydraulic brake on each, and work running on centers, eliminating adapters and costly tooling.

The illustration shows the two cast iron laps, individually braked. Adjustment of the braking pressure provides control on the amount of lapping action per revolution, in addition to the adjustment available through the setting of the time cycle.

The cycle itself is adjusted by means of automatic cut-out relays shown on the rear of the machine. The operator merely starts the machine by means of a push button. The ¾-h.p. motor drives the worm, which is mounted on centers, through a belt drive in one direction for a period determined by the setting of the relays which can be adjusted to from 15 seconds to 5 minutes. This laps one side of the worm thread.

The second relay then cuts in, cutting out the first, reversing the motor and lapping the reverse side of the thread. This relay can also be adjusted for a lapping cycle of from 15 seconds to five minutes. Thus the machine can be adjusted to take care of worms which, as frequently happens, consistently run better in production on one side of the thread than on the other.

Each lap can be adjusted for center distance individually, so that when laps are recut they can be put back to work on the same gear by means of this adjustment. The machine is designed to take care of the complete range of steering gear worms in use today, including both straight and so-called hour glass worms.

## Cleveland No. 9F Trimming Pre

The illustration shows the No. 9F Trimming Press which is now being built by The Cleveland Punch & Shear Works Company, Cleveland, Ohio. The press is arranged with a V-belt motor drive to operate at 65 strokes per minute and is used for upsetting test pieces. The pieces are first cut to length on the side shear, which has full hole shear blades and adjustable back gauges. After being cut, the pieces are set on end under the inner slide where they are securely held in an upright position by a magnet block which can readily be adjusted by the use of a hand wheel. The hand wheel adjusts the magnet back to the proper height and the adjustment is so designed that each notch on the dial of the magnet registers 0.001 in. A positive lock is also provided to hold the adjustment securely when it is once set.

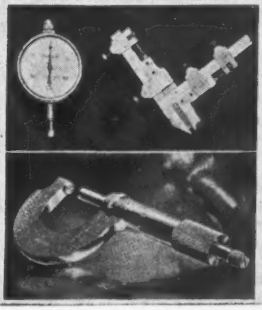
The slide is also arranged to take care of major adjustments. The entire

"You can't fool a machinist when it comes to tools. They're one thing we know more about than any brain trust. You can take it from me, they must have a lot of mighty fine toolmakers on the job at the L. S. Starrett shop. Just pick up a Starrett mike or a Starrett vernier and you can tell right away that some good men had a hand in making it. That's why I always say, 'Be sure it's a Starrett' when I ask for a tool at the crib. Starretts are good tools and good tools mean good work every time."

When you buy shop equipment tools, buy the tools your men would buy for themselves—Starrett Tools. There are more than 2500 Starrett Tools described in the Starrett Catalog No. 25 "MD". Write for a copy.

THE L. S. STARRETT CO.
*World's Greatest Toolmakers*
*Manufacturers of Hacksaws Unexcelled*
*Steel Tapes—Standard for Accuracy*
Athol, Mass., U. S. A.

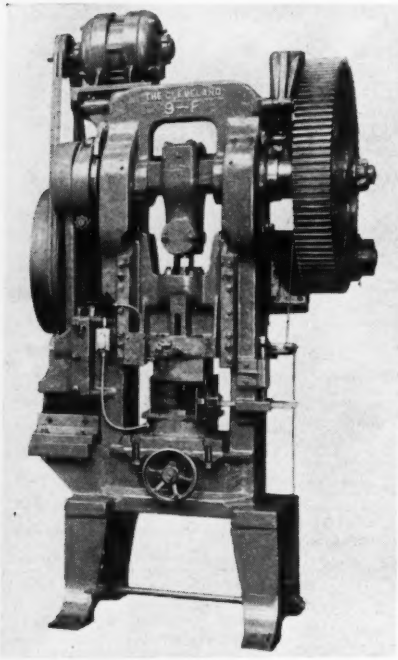
The tools shown below are Starrett Dial Indicator No. 25-A, Gear Tooth Vernier Caliper No. 456, Micrometer No. 230.



YOUR MEN *Prefer* STARRETT TOOLS

SEE THE STARRETT DISPLAY AT THE MACHINE TOOL SHOW, BOOTH A203

6449




**Cleveland No. 9 F Trimming Press**

tachment is boxed in and equipped with a safety door so that the press positively cannot be operated until the door is closed. The clutch also has a non-repeat attachment thus providing double safety for the operator. Presses of this type can be furnished in a wide range of sizes and capacities and with a variety of drives.

## Peerless 6½ x 6½-In. High Speed Metal Sawing Machine With Hydraulic Bar Feed

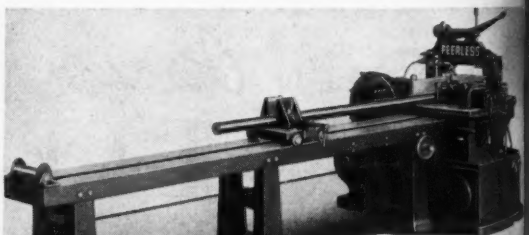
The Peerless Machine Company, 1617 Racine Street, Racine, Wis., has brought out a power hack sawing machine, built in 6½x6½ in. size and designed for exceptionally fast and accurate sawing of all kinds of metal. The machine is built with an enclosed three speed sliding transmission providing for 60, 100, and 145 strokes per minute. All gears run in oil, including the large drive gear, which is fully enclosed. The feature of the machine is the design and construction of the saw frame which with its four horizontal bearings and the saw frame guide with four vertical bearings entirely surrounding the blade insures accurate cutting. The gear box and balance lever are fully equipped with ball bearings. Blade capacity of the machine is 10 to 14 in. inclusive.

The machine can be arranged for either V-belt motor drive or belt drive. On the motor driven machine, the V-belt drive and motor are fully enclosed within the base of the machine. Push button control is standard equipment. The vise on the regular machine without the automatic bar feeding equipment is arranged for straight or angular cutting. The machine can be furnished with or without the Hydraulically-Operated Automatic Bar Feed with conveyor as shown in the illustration.

The Hydraulic Automatic Bar Feeding Equipment is designed so that it automatically opens the vise, feeds the bar of stock forward to the gauge, automatically closes the vise and automatically continues to repeat the complete cycle of cutting until the entire bar is cut into pieces of the length desired and without attention of an operator.

## Wickes Brothers Model C Automatic Crankshaft Lathe

The machine shown in the illustration is the Model C Automatic Center Drive Type Crankshaft Lathe now being marketed by Wickes Brothers, Saginaw




**6½x6½ Peerless Improved High Duty Metal Sawing Machine with Hydraulic Bar Feed**

# SUPERIOR FEATURES FOUND ONLY IN MORSE ROLLER CHAIN

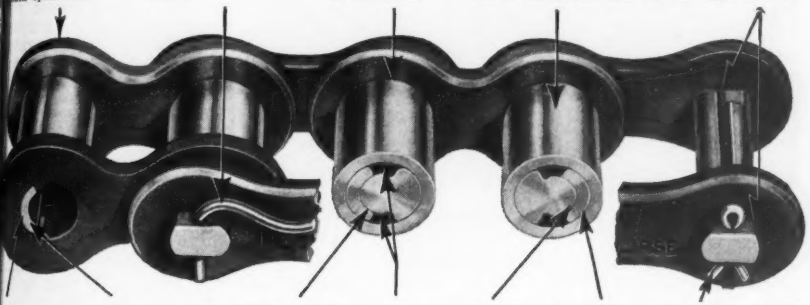
Interchangeable on all standard roller chain sprockets.

Morse Spring Lock Cotter.

Lubrication reaches inside of joint easily.

Solid rollers, turned concentric from alloy steel, heat-treated and precision ground.

Pins tightly pressed into side plate in both riveted and cotter type chain.



Pins and segmental bushings are cold drawn nickel steel carburized and hardened.

Segmental bushing securely held in side plate.

All joint movement under load is between pin and bushing.

Ample capacity inside every joint for lubrication.

This load bearing surface in every joint.

No joint movement under load between inside of roller pin or bushing.

Standard type cotter pins.

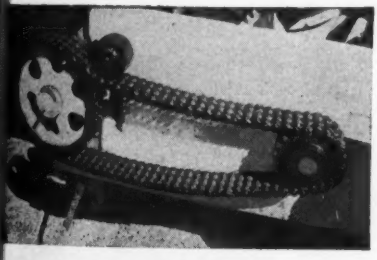
**POSITIVE LUBRICATION • RELIABILITY • LONG LIFE • LOW COST • ECONOMICAL**

"An outstanding achievement—the first real advance in roller chain construction in many years." That was the comment of a prominent engineer when he saw the new Morse Roller Chains several years ago. Since that time, Morse Roller Chains have demonstrated in thousands of applications that they are better—a really modern chain.

Morse Roller Chains, Cadmium plated, are now available for use on installations where resistance to salt spray and chemicals is necessary.

• • •

Standard attachments can be fitted to either side or both sides of Morse Roller Chains for use as conveyors.



**An Asphalt Plant**

Here is a Morse Roller Chain drive that does plenty of work. A 40 H.P. drive connecting two jack-shafts, used to rotate a cylinder in an asphalt plant. The drive is only covered with grease from time to time —does not operate in bath of oil, and is subject to severe shocks as the machine is loaded with various size gravel and tar. Plant owners are well satisfied with the superior performance of Morse Roller Chains.

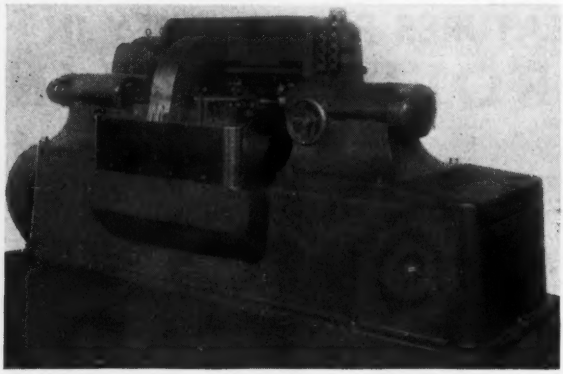
**MORSE SPRING LOCK COTTER**

The twist in the pin exerts powerful holding influence against loss of cotters due to vibration and chain whip — effectively guards against loss of side plates and chain breakage. Morse spring lock pins are recommended in place of cotter pins. They will not shake loose, and do not come out, but are easily removed.

Morse Roller Chains are available in all standard sizes. Morse engineers and representatives are located in the principal cities throughout the country. Complete engineering bulletins will be mailed to you on request. Write Morse Chain Company, Ithaca, New York.

## MORSE CHAIN COMPANY, ITHACA, N. Y.

**DIVISION OF BORG-WARNER CORPORATION**



**Wickes Brothers Model C Automatic Crankshaft Lathe**

Michigan. This lathe was designed for cheeking, turning, and filleting main line bearings, turning and shouldering the stub end of the crank, turning and straddle-facing the flange, and turning the oil groove complete on 4, 6, and 8-throw crankshafts having 3, 4, or 5 main line bearings.

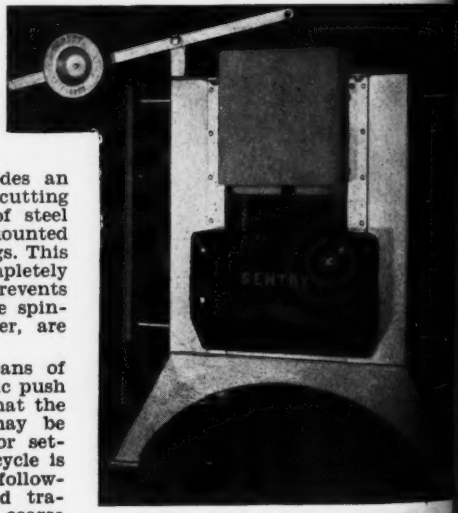
The crankshaft is held on centers and is driven by means of a chuck which securely clamps the crankarm adjacent to the center main bearing. This chuck, which is mounted in the center drive gear, not only drives but also holds the crankshaft in perfect alignment during the machining operation. The front tools are mounted on front cross slides in the usual manner while the rear tools are mounted on inverted cross slides carried in the back tool housing. This design provides an unusually rigid mounting for the cutting tools. The center drive gear is of steel with herringbone teeth and is mounted on two large tapered roller bearings. This drive gear and bearings are completely enclosed in a housing which prevents the entrance of chips or dirt. The spindles, which are 7 in. in diameter, are equipped with live centers.

The machine is started by means of an electric push button and electric push jogging buttons are provided so that the main drive gear or the tools may be jogged to any position desired for setting up the machine. The work cycle is entirely automatic, providing the following sequence of operations: rapid traverse of tools to cutting position; coarse facing feed; fine turning feed; diameter stop; dwell, which permits the crankshaft to revolve six eight revolutions wi the cutting tools are h at the finish diameter order to clean up cut; stop of lathe in u loading position; ra traverse of tools to u loading position.

Automatic forced f lubrication is provi throughout the ent machine. The main dr is by means of a 25 h motor through multi Vee belts. The net weig of the machine, wi electrical equipment, 21,000 pounds.

## Sentry Model "Y" Electric Furnace

The illustration shows a hardeni furnace that has been developed by T Sentry Company, Foxboro, Mass., esp cially for the hardening of high spe steel tools and parts. The furnace is tended to do a quality job, whether a production basis or on intermitt work. The overall dimensions of the f nace, not including the foot lever width, 24 in.; depth, 22 in., and heig 25½ inches.



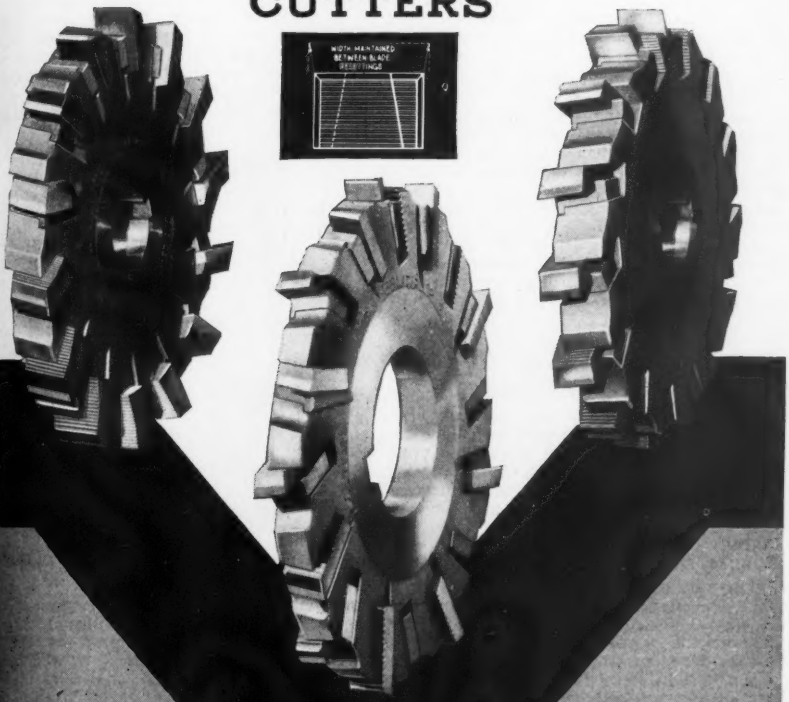
**Sentry Model Y Electric Furnace for High Speed Steel**

# INGERSOLL ~~ZEE~~ LOCK

## *Side Milling*

## CUTTERS



**LOW INITIAL COST**

...es standard Ingersoll Zee Lock ...ter Blades.

...ne Blade adaptable to many cutters.

...ades when worn adaptable to smaller ...ters.

**REPLACEMENT COST**

NEW SET OF BLADES FRACTION OF COST OF NEW SOLID CUTTER

Furnished with Ingersoll Zee Lock Cutter Blades of High Speed Steel, Super-Cobalt High Speed Steel, Stellite or Tipped with Cemented Carbide

...HAVE INGERSOLL ENGINEER YOUR CUTTING TOOLS. SPECIAL ...OR STANDARD. WRITE FOR TOOL CHARTS AND CATALOG.

THE INGERSOLL MILLING MACHINE COMPANY

ROCKFORD, ILLINOIS, U. S. A.

The furnace will provide operating temperatures up to 2500 deg. F. Construction includes a removable silicon carbide muffle chamber 4½ in. wide and 2 in. high by 9 in. deep, to accommodate Nos. 1, 2 and 3 Sentry Diamond Blocks. Heating elements above and below the muffle assure uniform furnace temperatures. Normal heating element life is 800 hours. Air-cooled terminals eliminate a cooling system. Terminals and all electrical contacts are shielded.

The furnace is of rugged construction, with a steel shell suitably insulated for high temperature operation. With reasonably new heating elements, the furnace will heat from cold to a temperature of 2350 deg. F. in less than an hour. Normal operating consumption of current is 2¾ to 5½ k.w., with a maximum rating of 10 k.w. The furnace will be supplied for bench mounting with the hearth 15½ in. above the top of the bench, or with pedestal mounting with the hearth 43½ in. above the floor. It is available for either 110 or 220 volts.

## Hannifin "Hi-Power" Portable Hydraulic Riveter

The completion of an entirely new type of hydraulic production riveting machine comprising a portable yoke-type hydraulic press and an automatic hydraulic pressure generator, connected by high-pressure hoses and electric control cable, is announced by Hannifin Manufacturing Company, 621-631 South Kolmar Avenue, Chicago, Illinois.

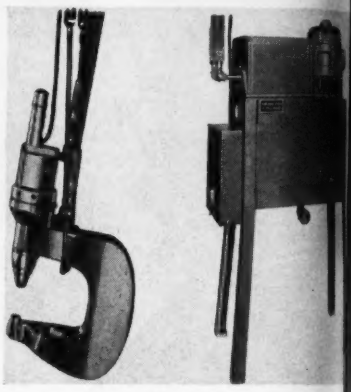
The portable yoke press weighs but 54 lbs., and develops a maximum pressure of 35,000 lbs., to head the rivet. This capacity is ample for ⅜-in. cold iron rivets. The throat of the yoke is 6x6 in., and the ram stroke 3 in. The maximum pressure developed on the dies may be adjusted to suit the work.

The riveting operation is controlled by a single push button at the top of the press handle. Depressing this button actuates the hydraulic pressure generating unit and its control valves, and the riveting cycle is completed automatically. The hydraulic pressure generator is a completely automatic power unit, with electrically actuated valves and oil pump control. It is driven by a 2-h.p. motor, and the outside dimensions are 32x17x56 in.; less than 4 square feet of floor space.

The hydraulic pressure generator provides large volume delivery at moderate pressure for rapid advance stroke of the press ram, an automatic step up to high pressure for the actual heading of the rivet, and an automatic reve upon reaching maximum pressure, w rapid reverse stroke of the ram to st ing position.

The complete riveting cycle is seconds per rivet, and this speed easily maintained. The press weighs o 54 lbs., and is provided with a spri type suspension, so that hardly more exertion is required than to han a pair of pliers. The control butt located at the top of the press han gives complete control of the entire op ating cycle, including the neces safety features.

When the control button is actua



Hannifin Hi-Power Portable Hydrau Riveter

the press operates as follows: The advances at moderate pressure, until die touches the rivet. When the makes contact with the rivet, the draulic pressure generator automati delivers pressure at 5,000 lb. per sq to head the rivet. At the peak pres the ram is automatically reversed, returns to the starting position wi rapid reverse stroke at moderate p sure. The control valves then auto cally move to neutral and the oil p unit idles at zero pressure until the cycle is started.

In steady production riveting, rivets placed by a helper in advanc the press, a time cycle of 2½ sec per rivet is easily maintained. No cial skill is required in handling press, or in accurately heading one after another.

The press will not repeat. When control button is depressed and down the yoke press completes one

New De Luxe HANDEE Grinder

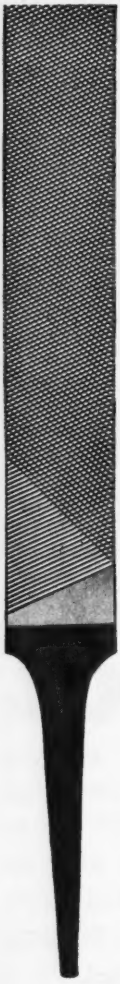
# Sensational ELECTRIC TOOL

For constant service. Nothing else like it. New design — modern materials — revolutionary performance. With a speed of 25,000 r.p.m. and ample power, this compact, easy-to-handle production tool does 1001 jobs with astonishing savings in time and labor.

Weighs 12 ounces. 6" long, 1⅝" in diameter. Fastest and most powerful portable tool for its weight and type ever developed. Price $18.50, complete with 6 Chicago Mounted Wheels. 10 Days Trial.

**Ask Your Supply House For Demonstration**
**Or Write For More Detailed Information**

**CHICAGO WHEEL & MFG. COMPANY**
110 S. Aberdeen Street Chicago, Illinois



LOOK FOR THE

RED TANG

when you get new Files.

RED on the tang is a trademark by which you recognize high, quality fast-cutting Files.

Ask Your Dealer

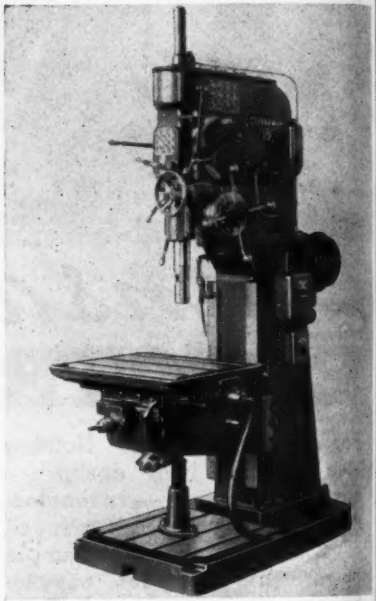
SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.


and stops. The instantaneous safety stop operates at any point in the riveting cycle, so that the operator can catch and prevent the stroke if the rivet head is not in the die, or if the rivet is crooked in the hole.

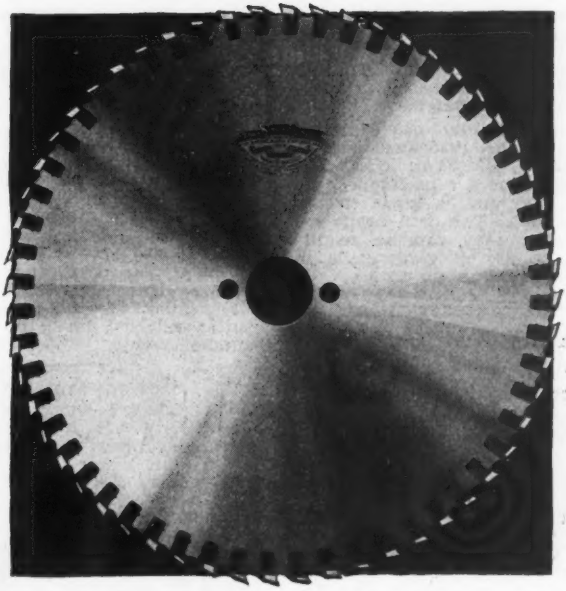
## Cleereman Automatically Oiled, Anti-Friction High Speed Drilling, Boring and Tapping Machine

The Bryant Machinery & Engineering Company, 400 West Madison Street, Chicago, Ill., is now marketing the Cleere-



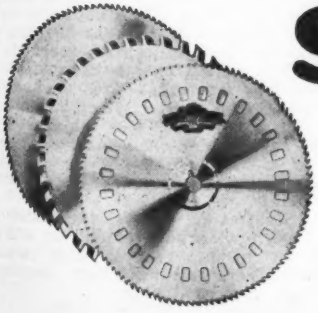
**Cleereman Automatically Oiled, Anti-Friction High Speed Drilling, Boring and Tapping Machine**

man Automatically Oiled, Anti-Friction High Speed Drilling, Boring and Tapping Machine shown in the illustration. This machine is designed especially to make possible the ultimate advantages of Tungsten and Tantulum Carbide Cutting Steels and is therefore equipped with greater power and for faster speeds. Unusual rigidity is a feature of the construction, reducing backlash of gears, shaft torque, and deflection of the major



*Get Metal Saw Information from Metal Saw Headquarters*

**When you want Solid or Inserted Tooth Circular Saws or Band Saws for cutting metal, let us quote you on the high quality Metal Saws made here at Metal Saw Headquarters.**



# SIMONDS

## SAW AND STEEL CO.

1350 Columbia Road
Boston, Mass.

127 So. GREEN ST.
CHICAGO, ILL.

FITCHBURG, MASS.

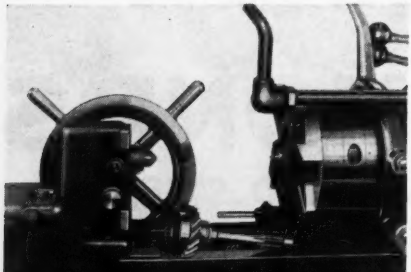
units to the minimum. Controls are conveniently placed and quick acting. The machine is completely geared, with positive feeds. Gears and anti-friction bearings are oiled by means of an automatic pressure oiling system.

The No. C-1½ Machine has a capacity of 1½ in. in SAE 1035 steel, and is made in 20, 22, 24, and 28-in. sizes. The No. C-2 Machine has a capacity of 2 in. in SAE 1035 steel and is made in the 24 and 28-in. sizes. The drill heads are designed so that they can be readily adapted for the use of gang drills in any number of spindles up to six.

## Work-Holding and Centering Attachment for Landmaco Threading Machine

The Landis Machine Company, Waynesboro, Pa., has developed a unique work holding attachment for use on the Landmaco Threading Machines. The accompanying illustration shows this attachment arranged for holding automobile clutch gears while performing the threading operation.

On this particular job it was necessary that the thread be concentric with the gear. In order to maintain concentricity the arrangement also included a live center, supported in the die head as illustrated. Thus, in effect, threading is done between centers. The gears are not rigidly clamped for the treading operation, but are placed by hand over the mandrel. They are driven by lugs on the mandrel engaging with the internal gear. The mandrel has a hardened and ground locating surface which serves to properly line up the gear for the threading operation.



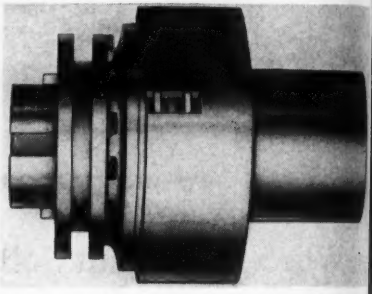
**Work-Holding and Centering Attachment for Landmaco Threading Machine**

The live center, which extends slightly beyond the face of the die head, is placed under spring pressure so that as the operator moves the carriage forward in order to bring the position of the gear to be threaded adjacent to the chasers, the center moves back into the bore of the head. The center operates in a hardened and ground bushing and has ample bearing surface to insure proper alignment.

The work holding and driving mandrel are applied to a standard carriage front or vise on the Landmaco Machine so that it can be applied very readily or removed if the machine is to be used for regular threading work. The live center in the die head and machine spindle are also removable.

## Conway Small Clutch

The Conway Clutch Company, 1530 Queen City Ave., Cincinnati, Ohio, announces a line of small clutches in three



**Conway Tandem Plate Clutch**

sizes, with 5⅝-in., 4½-in., and 3½-in. outside diameters in single plate for fractional horse powers and multiple plate for heavier drives.

The clutches can be operated singly or doubly, for forward and reverse drive either dry or in oil. The design of the clutch is similar to that of the larger size Conway Disc Clutches, except that the angle of actuation has been adapted to conserve fractional area and give strength to the carrier. Adjustment is made by hand and the clutches are proofed against centrifugal force. A set screw and key are all that is necessary for attaching the clutch to the shaft.

The illustration shows the Tandem Plate Clutch with adapter cup on which can be mounted a gear or other means of power transmission. Shaft coupling types are also available.

## Eisler Combination Welder and Trimmer for Flexible Shafts, Wire and Cable

The Eisler Engineering Co., 742 So. 13th St., Newark, N. J., has developed a combination cutting, welding, and trimming machine upon which flexible cable,

**Eisler Combination Welder and Trimmer for Flexible Shafts, Wire and Cables**

flexible shafts, stranded wire, and other cables composed of a multiplicity of small wires may be cut apart and the two ends joined and trimmed without unraveling, at the same time maintaining in the cable the same flexibility that existed before.

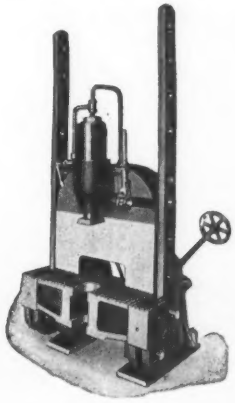
The combination welder and trimmer is designed to operate on either 110 or 220 volts, and can be mounted on a bench or furnished with a pedestal as shown in the illustration. It is equipped with a special annealing device for annealing the welded stranded wire, a push button for control of upset and current, foot-operated clamping jaws for holding the work, a lamp with reflector for lighting the work, and an especially-designed grinder or trimmer for trimming the work.

A flexible shaft or cable to be cut apart is clamped into the welding jaws. Application of current welds the strands together and finally severs the cable. The ends of the cable are then placed in the trimmer and finished off. The trimmer is equipped wth a carborundum wheel driven by a 1/20-h.p. motor. After welding, the ends are placed in the annealer, and when annealed, the cable is inserted into the automatic centering device and the burrs are ground off. The machine will handle either round or square solid rods or cables and bars up to 0.250 in. diameter.

## Watson-Stillman Hydraulic Vertical Horizontal Press

To meet a demand for a general utility shop press, the Watson-Stillman Company, 75 West St., New York, N. Y., has combined in one unit a vertical press for forcing, bending, straightening, and so on, and a horizontal press for all the operations which are ordinarily done on a press of this character. In the vertical position when equipped with a cast iron block and tool steel insert, as shown in Fig. 1, the press is suitable for die work. In this position also it can be used for bending pipe, for straightening shafts, pressing gears on and off shafts, and similar work. In the horizontal position the machine can be used as a bender, or for large forcing work.

The machine can be converted from

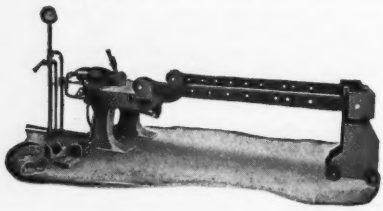


**Watson-Stillman Hydraulic Vertical-Horizontal Press in Vertical Position**

vertical to horizontal by rotating a handwheel, the press being so balanced that the change from the vertical position

can be made without the aid of a crane or jack. When forcing long shafts the abutment beam can be moved out a maximum of 7 ft., a four-wheel truck being provided to permit easy handling and to support the beam in the extended position.

The pump is used only for the high



**Watson-Stillman Press in Horizontal Position**

pressure stroke of the ram. The idle portion of the forward stroke and the return movement is effected by means of a hand lever which controls a pinion that meshes with a rack in the ram. The press can be operated by a hand pump or small power pump. The capacity of the standard press is 60 tons; ram stroke, 10 in.; vertical opening, 18 in., and horizontal opening 84 in. Weight, 3,700 pounds.

## Wahlstrom Tapping Adapter For Electric Drills

A tapping unit that can be adapted to an electric drill has been developed by the American Machine & Foundry Co., Wahlstrom Tool Division, 5510 2nd Avenue., Brooklyn, N. Y. A reverse mechanism is built into the unit in such manner that the slightest backward motion reverses the spingle and thus produces the motion necessary for tapping.

To attach the tapping unit to the drill, the open, or rear end of the unit is slipped over the front end of the drill with the driving shank of the tapper inserted into the drill chuck. The chuck is then tightened through a hole in the side of the adapter, the single capscrew is tightened which holds the unit to the drill, and the unit is ready for use.

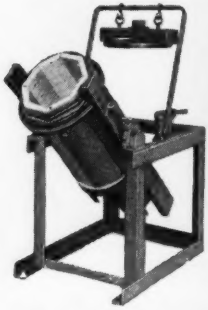
Bottom tappng is a feature of the unit for the reason that when the tap hits the bottom of the hole, it remains stationary until released. The adapter weighs 2½ lbs. It has a capacity of ¼ in. in steel. The shaft speed of the motor is reduced 1-3 for tapping.

**Wahlstrom Tapping Adapter applied to a Van Dorn Electric Drill**

## Mercil Type Burnishing Barrel

Several exclusive features mark the Mercil Type Burnishing Barrel developed by Hanson-Van Winkle-Munning Co., Matawan, N. J.

Extensive use of electro-welding and the use of anti-friction bearings throughout make possible a machine combining lightness, strength and durability. The burnishing barrel proper, gearing



**Mercil Type Burnishing Barrel**

and motor are combined into a single unit. Operation at any angle is quiet and efficient and the angle may be changed while the machine is running. Motor, gears and most of the cylinder are covered by a steel shell making the apparatus splash-proof. Safety guards are unnecessary with this machine.

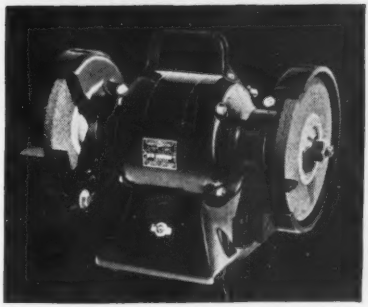
Operation is exceedingly simple. A motor control switch is mounted on the front of the frame. Notched plates on the right hand trunnion bearing lock the barrel at the desired angle. A unique cover lifting device and support facilitates handling the machine and the work.

# MAN-WHAT BARGAINS!

**A BLACK & DECKER DRILL FOR $19.50**

Meet the new ¼-in. JUNIOR—one of the sweetest little tools that ever turned a drill bit. Real BLACK & DECKER quality. Rounded housings for easier handling. Husky aluminum casings that can take it. "Compo" oil-less bearings. Ideal for hundreds of drilling jobs in metal and wood. See JUNIOR at your jobbers—today.

## A BENCH GRINDER FOR $24



Here's a grinder that's priced RIGHT—a great new unit for tool sharpening, light grinding, buffing, polishing, etc. Fitted with "Compo" oil-less bearings. Equipped with tool rests, wheel guards and carrying handle. See this new 6-in. Special at your jobbers—now. And write for the new catalog of Black & Decker Electric Tools. The Black & Decker Manufacturing Co., Towson, Maryland.

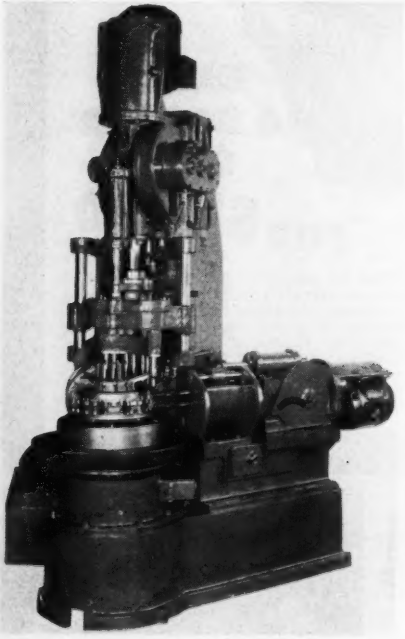
DRILLS
DRILL STANDS
POLISHERS
FLEX DISC SANDERS
HEAT GUNS

BLACK & DECKER

BENCH GRINDERS
PORTABLE GRINDERS
VIBRO-CENTRIC
VALVE SEAT GRINDERS
VALVE REFACERS

## Millholland No. 5 Automatic Indexing Drilling Machine

The illustration shows the No. 5 Automatic Indexing Drilling Machine, built by Millholland Sales & Machine Company, 936 East Georgia Street, Indianapolis, Ind., which has been improved to provide a wider range of feeds and speeds and to incorporate a number of new features. The index table will now



**Millholland No. 5 Automatic Indexing Drilling Machine**

operate at a rate of 720 indexes per hour.

Spindles to the number of 4, 6, 8, 10, or 12 can be included in the vertical drilling unit. The machine is sufficiently sensitive to drill 1/8-in. holes in steel and has power enough to drill ⅞ to 1-in. holes in steel or to bore up to 2½ in. and face up to 3-in. diameter. The machine employs up to 7½-h.p. motor on the vertical unit and up to 3-h.p. motor on each of the two horizontal units, which can be equipped with multiple spindle drill heads if required.

The machine base is made in several patterns according to whether or not horizontal units are required. The entire mechanism is synchronized by using a Standard No. 5 Millholland Automatic Drilling Unit in vertical position as a "Master Unit" for all feeds, both vertical and horizontal, and for automatic indexing. In this case, the motors on the horizontal units drive tool spindles only. An 18-in. diameter table is regularly employed and many compact designs of holding fixtures are available to permit multiple operations on a wide variety of parts. A new feature of the machine is an underneath burring attachment for holes drilled through the work vertically. The overall efficiency of the machine has been increased so that, in most cases, 70 per cent of the time movement in a complete cycle is actually used in cutting metal, the remaining 30 per cent being employed in rapid approach and return of tools and in indexing the table automatically.

Damage to machine through tools breaking off or sticking in the work is prevented by an overload safety clutch. The overload clutch throws out the feed to the entire mechanism and sets up a loud clicking sound when interference with indexing or tool feeding takes place. This does not, however, throw the machine out of time.

Paddle wheels on the index table remove chips by continuously pushing them into a chute in which they are carried by gravity through a downspout. A separate motor driven pump is provided for coolant.

---

## Dings Magnetic Clutch Coupling

Positive, quick engagement and disengagement, with less than 1½ degrees of slip, are said to be features of a magnetic clutch coupling which has been developed by the Dings Magnetic Separator Company, Milwaukee, Wis. The device has found wide application on hot and cold strip mill secondary screwdown shafts, soaking pit covers, and on many other applications where positive engagement and remote control are necessary or desirable. The Type SCC Clutch, shown in the illustration, transmits unusually high torque.

The illustration shows the coupling with the cover plate removed. Internal coil springs disengage the clutch. Bronze teeth engage steel teeth in the outer periphery. Lag, due to residual magnetism, is overcome entirely. Inherent disengagement follows. The cover plate

# Big and Little Formica Gears are Quiet!

FORMICA gears in large sizes are used with as much advantage on heavy machinery as the small ones give on light devices for the home, the office, and the store.

They take the scream and grind out of the drive and interpose an elastic member which will take up the shock of reversing drives, and save the machines.
For production purposes on new machines and for replacement in maintenance work, Formica gets more popular.

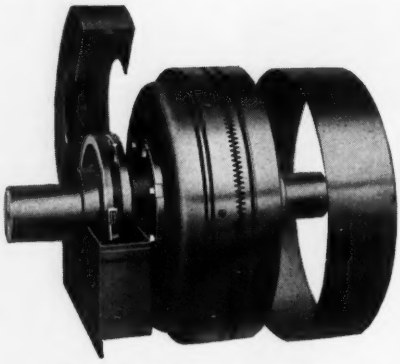
**THE FORMICA INSULATION CO.**
**4632 Spring Grove Avenue, Cincinnati, Ohio**

**FORMICA**
**NON-METALLIC GEARS**

**FORMICA GEAR CUTTERS**

The Akron Gear & En'g. Co., Akron, Ohio
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Slaysman & Company Baltimore, Md.
Harry A. Moore Bangor, Me.
The Union Gear & Mch. Co., Boston, Mass.
The Atlantic Gear Works New York City
Chicago Rawhide Mfg. Co. Chicago, Ill.
Perfection Gear Company Chicago, Ill.
The Mechanical Specialty Mfg. Co., Chicago, Ill.
Merkle-Korff Gear Co. Chicago, Ill.
Chicago Gear Company Chicago, Ill.
The Cincinnati Gear Co. Cincinnati, Ohio
The Horsburgh & Scott Co., Cleveland, O.
The Stahl Gear & Mch. Co., Cleveland, O.
The Master Electric Co. Dayton, Ohio
The Adams Company Dubuque, Ia.
The Ferguson Gear Co. Gastonia, N. C.
Hartford Special Mch. Co. Hartford, Conn.
Beaty Machine Works Keokuk, Ia.
The Generating Gear Co. Milwaukee, Wis.
Badger State Gear Co. Milwaukee, Wis.
Precision Machine Co. Milwaukee, Wis.
E. A. Pynch Co. Minneapolis, Minn.
Joaquin Alemany Lopez Havana, Cuba
New Jersey Gear & Mfg. Co., Newark, N. J.
J. Morrison Gilmour 151 Lafayette St. New York City
Sier-Bath, Inc. New York City, N. Y.
E. M. Smith Machine Co. Peoria, Ill.
The Eagle Gear & Mch. Co., Philadelphia, Pa.
Rodney Davis and Sons Philadelphia, Pa.
The Pittsburgh Machine & Supply Co. Pittsburgh, Pa.
Standard Gear Co. Pittsburgh, Pa.
H. W. Honeymon & Son Providence, R. I.
Perkins Machine & Gear Co., Springfield, Mass.
Winfield H. Smith, Inc. Springville, N. Y.
Alling Lander Company Sodus, N. Y.
Charles E. Crofoot Gear Corp'n, S. Boston, Mass.
Arlington Machine Co. St. Paul, Minn.
Farwell Mfg. Co. Toledo, Ohio
Diefendorf Gear Corp. Syracuse, N. Y.
Worcester Gear Works Worcester, Mass
Massachusetts Gear & Tool Co., Woburn, Mass.

prevents dust and dirt from lodging on the engaging teeth. Engagement is so rapid that "racking" of the teeth is impossible. The manufacturer claims that a 12-in. diameter Type SCC clutch will yield more than 1,500 pound torque.



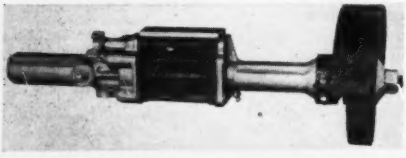
**Dings Magnetic Clutch Coupling**

## Rotor Type D-O-2 6-In. Grinder

The Rotor Air Tool Company, 5704 Carnegie Avenue, Cleveland, Ohio, has brought out the Type D-O-2 6-in. Grinder shown in the illustration. This tool has a twin rotor type of motor which is said to produce a smooth flow of power, free from vibration. The simple design eliminates all piston, toggles and connecting rods and permits the use of a one-piece spindle.

The tool weighs 9 pounds. To keep the weight as low as possible, the handles are made of magnesium alloy and are amply reinforced. This gives the grinder the proper balance.

A set-up in power has been achieved through the use of a new type 4-port governor which responds instantly to the load applied. This quick acting governor holds the speed of the tool within the safety limit and instantly cuts down the air consumption when the load is lifted.



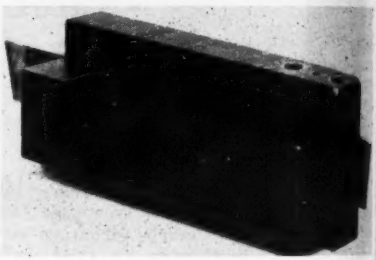
**Rotor Type D-0-2 6-In. Grinder**

## "Four-Grip" Rigid Toolbit Holder

A toolbit holder which holds the bit in a practical manner on all four sides, has been placed on the market by Four Grip Tool Co., 107 East 17th St., Paterson, N. J. The illustration shows one of these holders designed especially for use with a No. 1-A Warner & Swasey Chucking Machine.

The shank of the "Four Grip" toolholder is equipped with a V-block and setscrew of special alloy steel, scientifically heat treated so that it will not mushroom. The V-block is said to resist any distortion. In this holder the toolbit is rigidly held against deflection in any direction. No special bits are required.

The "Four Grip" holder is especially adapted for use with carbide tools, due to the fact that the shank, which is of comparatively soft material, is not mutilated and that it is efficiently and rigidly held in the proper location. A comparatively light screw pressure is required to hold the bit in position.



**"Four Grip" Rigid Toolbit Holder**

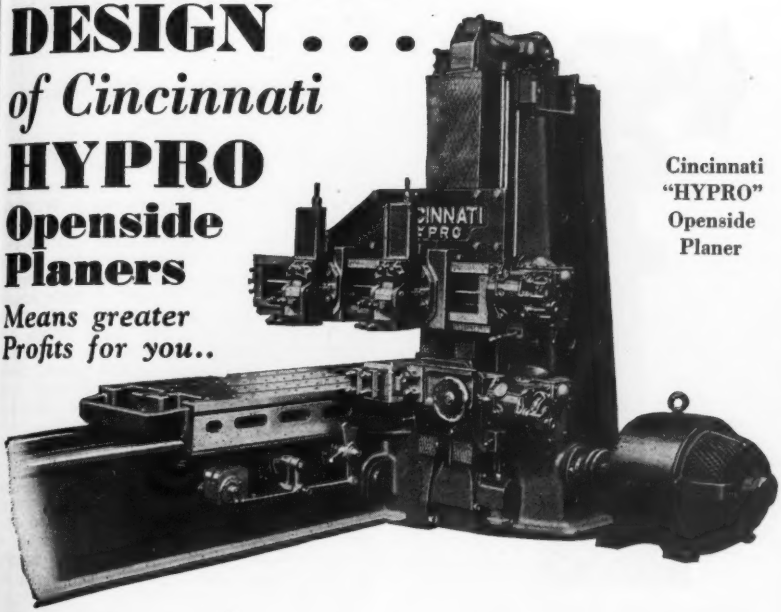
## Stanley Bench and Pedestal Grinders

The Stanley Electric Tool Division of the Stanley Works, New Britain, Conn. now offers 7-in. and 10-in. grinders designed to incorporate a long spindle construction that provides more space between the wheels and the motor, making it easier to grind large, odd-shaped pieces. The grinders are recommended for general grinding, buffing, polishing, or wire brush work. They are said to be sturdy, vibrationless, and smooth-running.

The spindles are mounted in full ball

# ADVANCED DESIGN . . . *of Cincinnati* HYPRO Openside Planers

*Means greater Profits for you..*




Cincinnati "HYPRO" Openside Planer

USERS of the Cincinnati "HYPRO" Openside planers know that these machines may be depended upon to do the rough work as well as the accurate work . . . and do both at a greater profit.

That is why you'll usually find a Cincinnati "HYPRO" Openside planer wherever there is planer work to do.

But, that's not the whole story . . . there are many features of the Cincinnati "HYPRO" Openside planer that you should know about. Cutting speeds and return speeds up to 240 feet per minute.

●

## THE CINCINNATI PLANER COMPANY

CINCINNATI OHIO

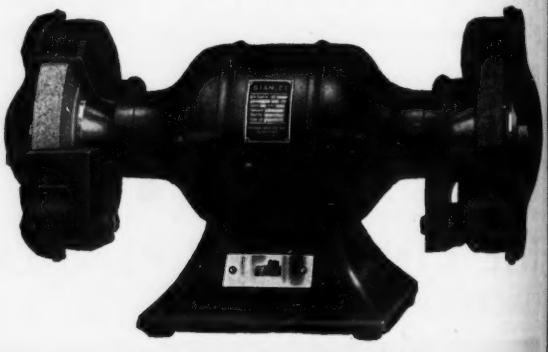
bearings which are enclosed against dirt and grit. The bearings are mounted close to the wheels to eliminate spindle vibration. The wheels are fully enclosed in guards, cover fitting over the rims of the guards to provide greater strength. The guards are easily adjustable for grinding at any point on the wheel circumference. End covers are easily removed for changing wheels. Two rests are mounted on the wheel guards and are adjustable to follow wheel wear. Stanley Safety Eye Shields may easily be attached to the wheel guards, tapped holes being provided for this purpose.

**Stanley No. 610 Pedestal Grinder**

The seven-inch grinder, designated as the No. 557, is equipped with two 7x1 in. grinding wheels, one coarse and one fine. The motor is 1/3 h.p. Length over all is 19¾ in. Shipping weight, 75 pounds.

The 10-in. grinder, No. 610, has two 10x1 in. grinding wheels one coarse and one fine. The motor is 1/3 h. p. and the length over all is 24 inches. Shipping weight, 160 pounds.

Pedestals can be furnished with both machines.



**Stanley No. 557 Bench Grinder**

## Pratt & Whitney Die Sinking Cutters

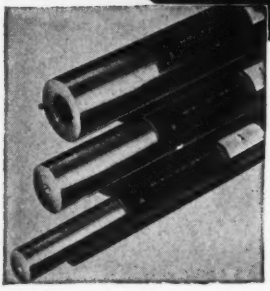
In order to obtain full cutting efficiency of the increased spindle speeds available in the modern Universal Die Sinking Machines, the Pratt & Whitney Company, Hartford, Conn., has brought out a series of die sinking cutters for high speed use. These tools are known as ball end, square end, and 7 degree taper cutters. The design of helix angle, relief, and so on are such that they are able to operate in the new tough die steels at speeds up to 3600 r. p. m. The cutters are of high speed steel, heat treated for maximum toughness and cutting characteristics for use in heat treated alloy steel die blocks.

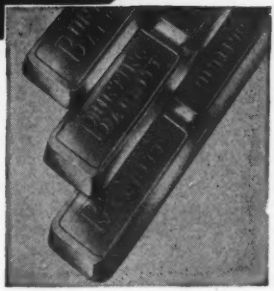
The ball end cutters and square end cutters are regularly furnished with right hand cut and right hand spiral flutes. Both of these types of cutters are available in 13 sizes ranging from ⅛ to 1¼-in. diameter inclusive. The length of the cut varies from ⅞ to 3¼ in. on the ball end type and from ⅞ to 2¾-in. on the square end cutters.

The 7 degree taper cutters are available in 12 sizes ranging from ⅛ in. to ½ in. inclusive. This nominal size designates the diameter of the ball at the small end. These cutters also are regularly furnished with right hand cut and right hand spiral flutes. Diameters of shanks on these cutters range from ½ to 1 in. and the length of cut ranges from

OVER 500 different sizes ⅜x¼x1¼ to 4½x4x7. Completely machined and finished, ready for assembly.

INSTANTLY available from stock at any time and in any quantity—one or a million... Write for catalog.



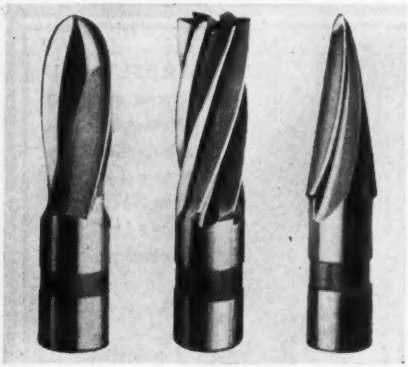


**BRONZE BARS**—Cored and solid. 121 stock sizes. Cast in 13" lengths to cut without excessive waste and machined and centered to save labor. Immense savings when compared with rough stock. Ask your dealer or write for catalog.

**INDUSTRIAL BABBITT**—Pours like oil. Lowest coefficient of friction in the market. Non-adhesive close grain. Smooth-wearing, durable, self-lubricating, self-cleaning. Absolute uniformity assured in every bar and every shipment. Sold by all leading dealers.

THE BUNTING BRASS & BRONZE COMPANY, TOLEDO, OHIO
Branches and Warehouses in All Principal Cities

BUNTING Bunting Quality
BRONZE BUSHINGS • BEARINGS
MACHINED AND CENTERED BRONZE BARS
ANTI-FRICTION METAL



**Pratt & Whitney Die Sinking Cutters**

1½ to 3 in. Cutters may be supplied with nicked or gashed teeth for roughing if desired.

The design and size arrangement of each type of cutter is entirely new, resulting in adequate chip clearance and providing sufficient projection length for deep die sinking. It is now possible to machine deep pockets and sections of dies without chatter or spindle interference.

## Armstrong Line of Chrome-Vanadium Steel Socket Wrenches

Armstrong Bros. Tool Co., 328 N. Francisco Ave., Chicago, Ill., announces a complete line of Chrome-Vanadium Steel Sockets for detachable head socket wrenches. The new sockets come in all sizes and types from the 5/32 in. miniatures for fine electrical work up to the 2½-in. extra heavy duty sockets.

Included in this line are both double-hex and double-square sockets, sockets for miniature light, standard, heavy duty, and extra heavy duty drivers, and handles, extensions, and ratchets. The sockets are chrome-plated and come

**Armstrong Chrome-Vanadium Steel Socket Wrench**

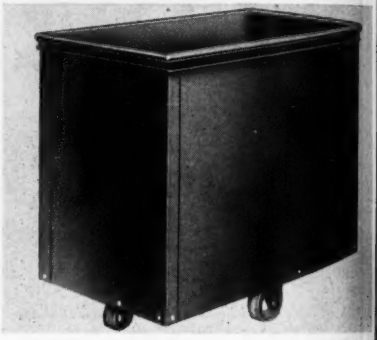
singly or in matched sets made up for all industrial, electrical, and automotive uses. Sets come in fitted steel cases.

## Stackbin All-Steel Box Truck

The all-steel box truck shown in the illustration—a product of the Stackbin Corporation, Troy St., Providence, R. I.—is designed to supply the need for a box truck which is smooth on the inside, with no rivets, bolts, slivers, and so on to catch or tear materials and yet which will withstand many years of wear.

The standard box truck is built with sides and ends of 20 gauge sheet metal, the upper edge being rolled and reinforced with special rounded corner castings and a channel steel bar entirely around the truck under the rolled top, forming very rigid construction. The bottom is of 18-gauge sheet steel, formed and securely welded into the bottom of the truck. The chassis frame is of heavy gauge formed steel channel, securely welded, on which are mounted the two 3-in. swivel and two 4-in. stationary casters.

The finish is battleship gray, baked on



**Stackbin All-Steel Box Truck**

synthetic enamel. Any size of box truck of the construction described above will be supplied upon order.

## Thiel Precision Die Sawing and Filing Machine

The machine shown in the illustration, a product of Marburg Brothers, Inc., 90 West Street, New York, N. Y., is especially designed for precision sawing and filing of dies, punches, templets, gages, and similar tools. The machine will saw any material up to high speed toolsteel 3¼ in. thick without special attachment or up to 6 in. thick when a band saw attachment is used. Jewelers' saws and heavier saws up to ⅝ in. wide

# THE PIECE-WORKER KNOWS THERE IS A DIFFERENCE

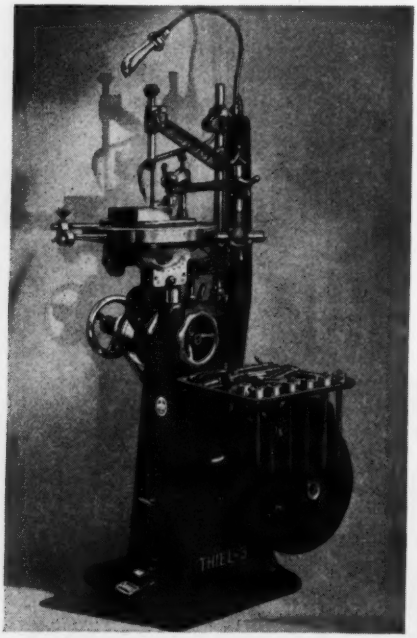
**One of the greatest unofficial testers of small tools is the piece-worker. His pay envelope is a reliable indicator of how well the cutting tool is standing up — how rapidly and economically it is performing.**

**Piece-workers know that there is a difference in small tools. The fact that they so frequently insist on Morse Tools is one of the sincerest tributes which industry can pay to Morse quality. It is proof positive that you can count on steady production, fewer delays, longer working life from Morse cutters, reamers, drills, taps and dies.**

There is a Morse Distributor convenient to you

**MORSE**
**TWIST DRILL & MACHINE COMPANY**
**NEW BEDFORD - - - MASS., U. S. A.**

NEW YORK STORE: 92 LAFAYETTE STREET - - CHICAGO STORE: 570 WEST RANDOLPH STREET



**Thiel Precision Die Sawing and Filing Machine**

can be used in this machine.

The design of the machine is such that saw blades are prevented from bending, thus assuring a straight and clean cut. The table can be tilted in any direction desired. The stroke is variable and an automatic feed with relief on the up-stroke increases the sawing speed and prolongs saw life. An air pump provides air for blowing away chips and thus permits the operator to follow the layout line closely.

The machine can very quickly and easily be changed over from sawing to filing. Files from 0.02 in. thick up to ⅞ in. x ¼ in. are used in this machine, the file being held securely at top and bottom. The machine is supplied in either bench or pedestal type.

## Pratt & Whitney 10-In. Tilting Rotary Table

Pratt & Whitney Company, Hartford, Conn., has placed on the market a 10-in. Tilting Rotary Table designed for use with the Pratt & Whitney No. 1A Jig Borer. This new table is for precision boring holes at exact angles as well as for boring work of a circular nature and of the type that is most easily laid out using polar coordinance. The scraped surface is 10 in. in diameter, and contains standard T-slots and an accurate hole in the center for locating work.

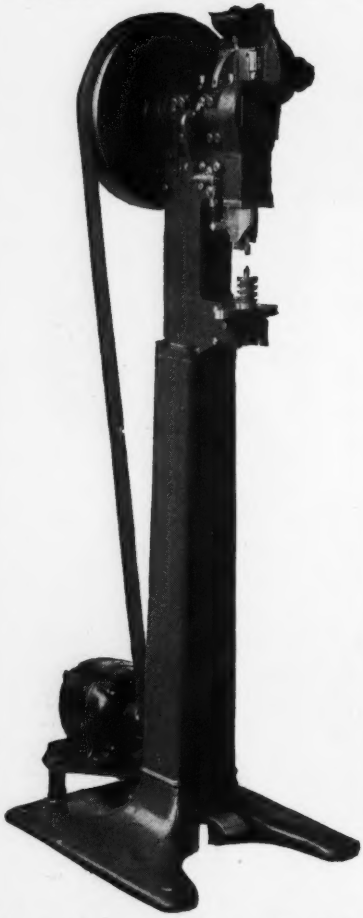
The outer edge of the table is graduated in degrees for approximate indexing, which is done by the use of a large rapid traverse handwheel. For exact setting, a slow motion handwheel is engaged by a clutch knob. The large graduated dial and its vernier make possible accurate indexing to two seconds. A non-influencing binder keeps the rotary movement locked solidly during boring.

The entire table is hinged at one side and can be tilted to any angle from zero to 90 degs. Graduations and a vernier provide for accurate setting in one minute. The tilting movement locks solidly during boring. Super-precision ball bearings are used throughout. The table height in a horizontal position is 6-½ in., and its net weight is approximately 200 pounds. It is furnished with a proving bar, a chart, a gage for angular setting and with either hold down straps or T-bolts.

**Pratt & Whitney 10-In. Tilting Rotary Tab**

FOR INTERNAL GRINDING
STERLING offers REAL
PRODUCTION WHEELS
Due to the ever increasing demand for STERLING internal grinding wheels, we have found it necessary to increase our facilities in this department.
This surely is proof that STERLING internal wheels are very much in demand for their cutting, grinding and polishing qualities. You will be pleased with their action and long life.
THE STERLING GRINDING WHEEL COMPANY
TIFFIN, OHIO
CHICAGO
DETROIT
STERLING ABRASIVES

# THE RIVITOR



**A machine that automatically feeds and sets solid rivets with as much speed and accuracy as tubular rivets and a 10% to 19% gain in strength of the joint accomplished.**

*Write for Circulars*

**TOKMINS- JOHNSON CO.**

**620 N. Mechanic St., Jackson, Mich.**


## Shaw-Box "Grip Lifter"

A device for use with a crane for safely handling steel plates, columns and similar materials has been developed

**Shaw-Box "Grip Lifter"**

by the Shaw-Box Crane & Hoist Co., Inc., Muskegon, Michigan. The device known as the "Grip Lifter," is made in two sizes; with ⅝-in. throat to handle up to 5 tons, and 1½-in. throat, with a maximum capacity of 10 tons.

The Grip Lifter is suspended from the crane or hoist by means of the eye at the top of the lifter, then the lever on the side is pulled down by means of the cable, stretching the spring and pulling the sliding bars upward. This leaves the throat free to engage the load. With the edge of the plate or column in the opening in the throat, the lever is released and the sliding wedge slides down into place, wedging the load securely. The lever is then released, but the load is held in a grip that cannot be broken until the load has been landed and the tension removed, after which the wedge can again be moved up and the load released. The load cannot be released in the air, as the pull on the lever must exceed the weight of the suspended load.

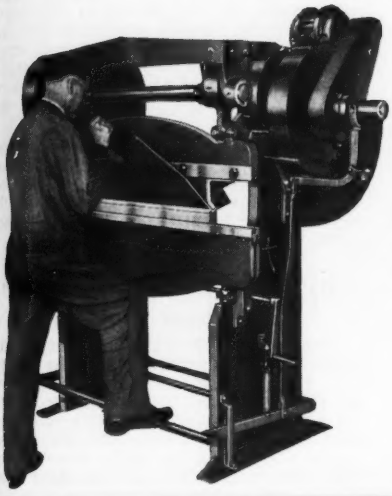
---

## Cutler-Hammer Magnetic Clutch

A general purpose magnetic clutch with a number of important improvements has been announced by Cutler-Hammer, Inc., 398 N. 12th Street, Milwaukee, Wisconsin.

An outstanding feature of this clutch is the method of adjusting the friction

# THIS No. 253 CHICAGO STEEL PRESS



## Will Do 40% to 60% of the Forming Work Turned Out by the Average Shop

This compact, ruggedly built, 48", No. 14 gauge capacity, Chicago Steel Press brake is an economical and profitable production unit. It is ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes and a great variety of sheet metal specialties. Variable speed drive operates from 17 to 50 strokes per minute. Precision built of highest quality materials by master craftsmen.

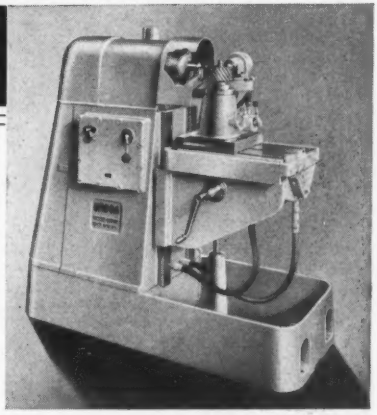
Write for Circular No. 253

**DREIS & KRUMP MFG. COMPANY**

7418 LOOMIS BLVD.

CHICAGO ILLINOIS

# GEAR TOOTH ROUNDING

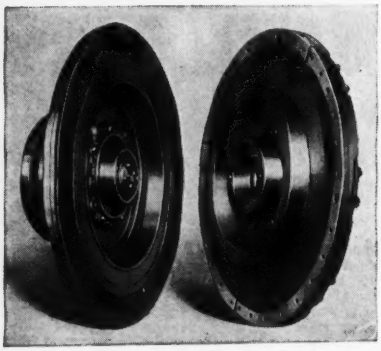


The No. 35 Cross Gear Tooth Rounder is unique because it will round, chamfer or burr all types and sizes of gears and splined shafts within its rated capacity. It will easily handle spur, helical, herringbone, spiral bevel, hypoid gears and straight or tapered splined shafts.

Individually centralizing each tooth in exact relation with the cutter and holding the gear absolutely rigid during the cutting operation are characteristic features of the No. 35 Cross. This machine is devoid of all mechanisms of a special nature—there are no cams, master indexing plates or indexing gears—and it may be quickly and easily set up and changed over to handle a wide variety of work without incurring any secondary or additional expenses.

Regardless of your present methods or equipment, it is universally recognized that your standards of quality can be raised and your production costs reduced by installing one or more No. 35 Cross Gear Tooth Rounders.

**CROSS GEAR & MACHINE CO. 3250 BELLEVUE, DETROIT, MICH.**



Cutler-Hammer Magnetic Clutch

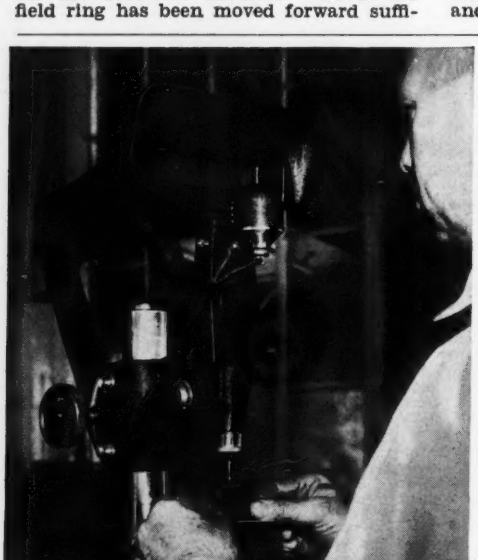
faces to compensate for wear and to assure uniform lining engagement. The inner circumference of the field ring is threaded and the adjustment made by rotating the field ring, in respect to the magnet field member, and consequently moving it toward the friction surface on the armature member. When the field ring has been moved forward sufficiently to compensate for the wear, it is locked firmly in position.

A floating magnet armature is used in this clutch, making it impossible to score the magnet pole faces even if proper adjustment on the lining is not maintained. This feature overcomes the disadvantage of the conventional single friction face clutches, on which grooving and scoring of the magnet poles result from improper maintenance of lining adjustment.

Other features include a magnet coil which may be readily removed and replaced as a unit, rugged bronze collector rings, a lining wear indicator, and a pilot bearing to insure concentric engagement of the two members.

## Briggs & Stratton "Air Saver" Leak-Proof Air Valve

The Briggs & Stratton Corporation, Dept. MS-7, Milwaukee, Wis., has brought out a leak-proof air valve to be known as the "Air-Saver." The feature of the "Air-Saver" valve is the stainless steel and brass construction; the use of these materials makes the valve non-corrosive and free from rust; thus no time is lost

*Setting amplifying gage with a combination of 3 Johansson Gage Blocks.*

**YESTERDAY .001"**
**TODAY .0001"**

***LIMITS ARE GETTING CLOSE***

**Many of the limits long established in thousandths of an inch are being changed to ten-thousandths. This demands increased accuracy of jigs and fixtures — machine tools must produce parts with greater precision.**

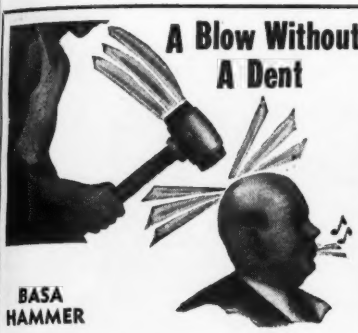
**JOHANSSON**
**GAGE BLOCKS AND ACCESSORIES**

**are the practical, economical solution to increased accuracy in your tool room or inspection work. They are real time-savers. Low prices for "B" quality Blocks—accurate to .000008 inch—permit their use even in smaller shops.**

***Manufactured and Serviced by***

**FORD MOTOR COMPANY**
***Johansson Division*** **Dearborn, Mich.**

**See the Johansson Display at the Cleveland Machine Tool Show. BOOTH A-**




**BASA HAMMER**

*Speeds up the Work Without Doing Damage*

**In finishing and assembly work it is often desirable to use a hammer that can strike more than one kind of blow.**

**Any combination can be secured by the quick adjustment of the necessary faces. Made in five different sizes.**

**A soft-faced hammer of improved design and construction.**

**A Hammer that will strike blows of varying hardness without marring the surface.**

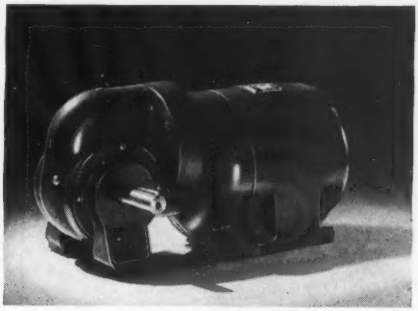
**The Rawhide Copper and Babbitt Faces make it possible to adapt this Hammer to any class of work.**

*Send for Full Particulars*

**GREENE, TWEED & CO.**
**Sole Manufacturers**
**109 Duane St. New York**

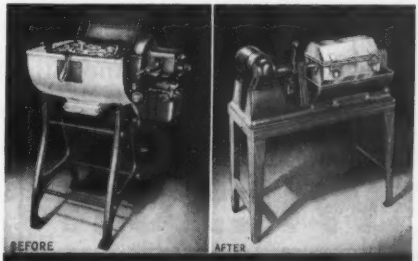


# While everyone's talking billions



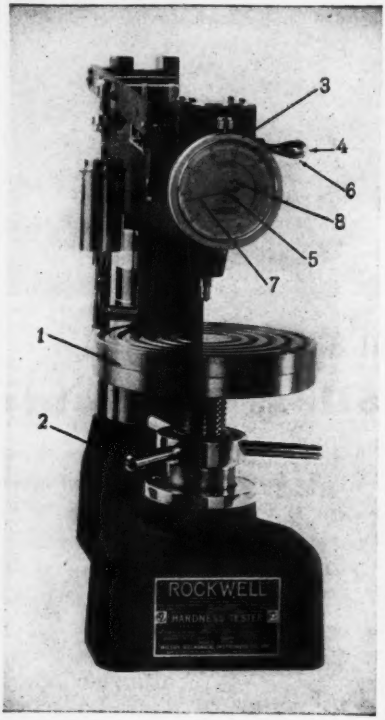
# let's not forget **dollars and cents**

For instance the dollars and cents that a Master Geared Head Motor meant to this manufacturer of a silver burnishing machine. Since the redesign of the machine which was made possible by the application of a Master Geared Head Motor, this manufacturer was able to reduce his selling price from $350.00 to $245.00 . . . and just look at the improvement in appearance. Let Master Engineers show how Master Geared Head Motors may mean dollars and cents to you.




THE MASTER ELECTRIC COMPANY
DAYTON OHIO U S A

"ROCKWELL"
HARDNESS TESTER




These eight things are done, some with the hands and some with the eyes, and all together take about as long as it takes to light a pipe.

WILSON
MECHANICAL INSTRUMENT CO., INC.
Concord Ave. and E. 143rd St.
NEW YORK N. Y.

due to shut-downs for valve repairs due to these causes.

The valve is designed for use on punch presses and other machines where com-

Briggs & Stratton "Air Saver" Valve

pressed air is used more or less contin ously, and simple mountings are provi ed for this purpose. The valve is quick and easily attached.

## Gier "Downward Grip" Machi Vise

The "Downward Grip" Machine v shown in the illustration, a product the C. R. Gier Company, 75 West Str New York, N. Y., has been especially signed for use in gripping work planers and milling machines and said to be advantageous where ac rately machined surfaces are required.

The design of the vise is such the jaws exert an extremely powe downward pull during the gripping o ation, this object being achieved by use of slides which carry the jaws. pressure is applied to the jaws in g ping the work, a corresponding do ward movement of the jaws, toge with their slides, takes place. Co quently the work is held and at the s time is forced downwards onto its

Cloth Roll Bearing for Textile Machinery

Handle for Camp Cooking Stove

# These parts are made of Wilmington Vulcanized Fibre

Every day, new uses for Wilmington Vulcanized Fibre are found in all lines of industry. With our complete equipment for all machining operations, the possible parts we can turn out is practically limitless. What's more, we can make them in quantities of three million a day. Why not consider where Wilmington Fibre Parts can be used on your products, then get in touch with us. We have a 32 page catalog we would be glad to send you.

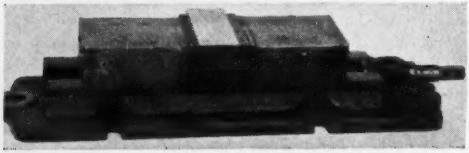
Do they suggest a use for you?

"Wilmington Fibre"

WILMINGTON FIBRE SPECIALTY COMPANY

PIONEERS IN FIBRE FABRICATION WILMINGTON, DELAWARE

"The Blade in the Plaid Box"
LENOX HIGH SPEED HACK SAWS
AMERICAN SAW & MFG. CO.
QUALITY
LENOX
TOOLS
SPRINGFIELD, MASS. U.S.A.
"LENOX"
HACK SAWS
BAND SAWS
YOU OWE IT TO YOUR BUSINESS
To Try a Box of
"LENOX" HIGH SPEED HACK SAW BLADES!
Their toughness, performance and uniformity will save you time and money—improve workmanship and efficiency.
(Save this ad as a reminder to order a trial box from your jobber.)



Gier "Downward Grip" Machine Vise

which is either the base of the vise or parallels placed between the base and the work.

The mechanism of the vise is enclosed and protected against all external detrimental influences, and the hardest service is said to produce no frictional effect. The principal parts, such as jaws, and so on, may readily be replaced.

The vise can be supplied in four sizes, and either the plain type with one jaw stationary and the other working, swiveling type, plain type with both jaws working, or either half of the vise can be supplied.

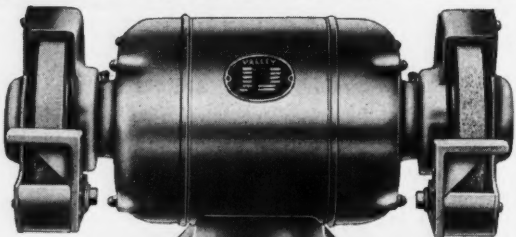
## "Pony" C Clamp

The illustration shows one of the line of "Pony" miniature C clamps now being manufactured by the Adjustable Clamp Co., 415 N. Ashland Ave., Chicago, Ill. The clamp shown has a 1-inch depth of throat and opens to a minimum of 2 inches. The line includes clamps with ½-inch depth of throat and opening to corresponding dimensions. Although light and adaptable for tool work and other fine jobs, the clamps are of substantial construction. Frames are of malleable iron, and the foot of each clamp is ground smoothly and accurately and plated with cadmium. The steel screws have standard threads, and each screw is tipped with a freely-turning swivel deeply riveted. The "loose-pin" handle provides ample pressure, without resorting to pliers, and yet permits closing in close quarters.

Adjustable "Pony" C Clamp


# A Heavy Duty VALLEY Ball Bearing BENCH GRINDER AT $27.50

Full 1/3 H.P. motor 3450 R.P.M. Oversize Ball Bearings mounted in dust tight housings. Repulsion - Induction Single Phase Motor (Not Split Phase). Can be attached to any light socket. Fully guaranteed.



2-7" Dia. x 3.4 face wheels (Not the usual ½" face wheels). Inclosed Guards, Adjustable for wear of wheel. Substantial Base with Cord and Plug and Switch in Base.

**VALLEY ELECTRIC** manufactures a Complete Line of Bench, Pedestal type Buffers and Grinders.
¼ H. P. to 7½ H. P.

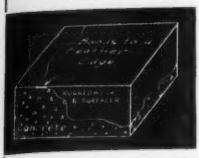
**VALLEY ELECTRIC CORPORATION** St. Louis, Missouri

*Mfrs.* of Ball Bearing Motors ¼ to 40 H. P.

Just What the Name Implies

**RUGGEDWEAR RESURFACER**

for repairing rough, worn, and broken places in concrete floors.



**NO**
Chipping
Chopping
Heating
Materials
Air-Hammering

**Bonds to a Feather Edge.**
**Ruggedwear provides—**
Greater Coverage
Longer and Smoother Service
at a Lower Cost

1—Clean
2—Mix
3—Place

SIMPLICITY

Everyone who tries RUGGEDWEAR is immediately impressed with the improvement in this product. We are particularly pleased to have our customers compare results with other methods and materials.

RUGGEDWEAR RESURFACER is now used by every major industry in America including such companies as E. I. du Pont de Nemours, Union Pacific Railroad, Gulf Refining Co. and innumerable others.

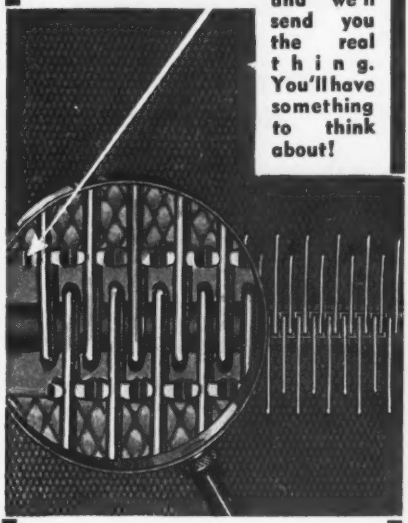
*Write for Pamphlet. No charge or obligation. Also ask about FREE TRIAL OFFER*

**FLEX ROCK COMPANY**
852 No. Del. Ave., Phila., Pa.

*Safety*
REG. U. S. PAT. OFF.

**BELT HOOKS**

Here is just a picture of a Safety lacing. Mail the coupon below and we'll send you the real thing. You'll have something to think about!



**Safety Belt-Lacer Co., Toledo, Ohio**

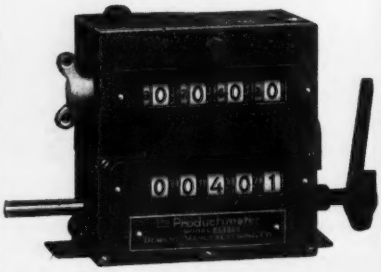
Send us a belt end laced with Safety Belt Hooks, and explain why there is no waste and how we save time, money and belts through their use.

Signed .....

Position .....

City .....

State .....




## Over-runs and Under-runs

or the care needed to prevent them can be banished for good by putting *Predetermined Productimeters* (preset counters) on all production machines. These counters will:

1. Record continuous output on lower row of figures.

2. Record current run on upper row of figures—reset for next run.

3. Give a signal or stop machine when a certain count (preset on upper row) is reached.

Send for our catalog of counters and lineal measuring devices for all types of machines, conveyors, engines, pumps, compressors, etc. or ask for one of our field engineers to look over your counting and measuring problems.

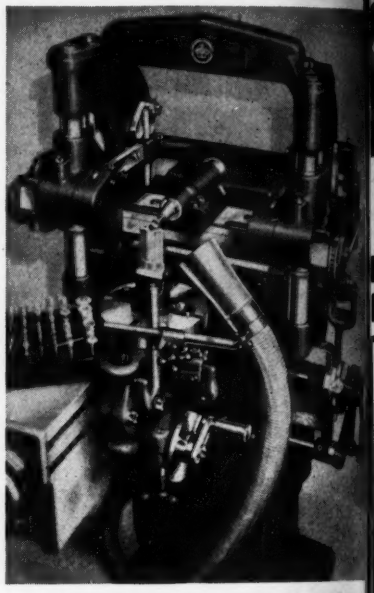
DURANT MFG. CO.

1932 N. Buffum St. Milwaukee, Wis.
173 Eddy St. Providence, R. I.

Productimeters
THE SPEEDOMETERS OF INDUSTRY

## Grinding Attachment for Thiel No. 32 Vertical Punch and Form Shaper

To expedite the finishing of hardened punches, a device which can be used in connection with the Thiel Vertical Punch and Form Shaper for grinding hardened punches and similar work has been brought out by Marburg Brothers, Inc., 90 West Street, New York, N. Y. This attachment greatly enlarges the scope of work that can be handled on this shaper.



**Grinding Attachment for Thiel No. 32 Vertical Punch and Form Shaper**

It consists of a self-contained unit built to operate at spindle speeds of up to 40,000 r. p. m.

The change from cutting to grinding and vice versa is extremely simple, since only the tool has to be replaced by the grinding attachment. The swinging mechanism of the tool holder support is disengaged by loosening a screw; thus the tool holder support, and with it the grinder, moves in a vertical direction with a reciprocating movement which can be adjusted for position and length of stroke exactly the same as in shaping.

# Escape the grip of OIL DERMATITIS

The entire working force of your plant may be caught in the grip of Oil Dermatitis. Carried from worker to worker by cutting oils and compounds infected during use, this serious skin disease spreads rapidly . . . crippling production, lowering plant efficiency . . . reducing your revenue.

You can protect your men from infection by sterilizing cutting oils with Derma-San. Add 1 pint to 35 gallons of lubricant and kill pus-forming germs before they reach workers' hands.

**DERMA-SAN**
DISINFECTANT

*The* **HUNTINGTON LABORATORIES** *Inc.*
HUNTINGTON INDIANA
TORONTO, ONT. 72-78 Duchess St. • 999 S. Logan St. DENVER, COLO.

**DERMA-SAN IS EXCELLENT FOR ALL GENERAL PLANT SANITATION**

*RUN THEM FASTER*

*FEED THEM FASTER*

# CUT YOUR COSTS TWO WAYS!

WEL-DON Double-End Mills cost less to BUY—that's the *first* saving. They cut faster and cleaner—that's the *second.*

*You "Cut Cutting Costs" Both Ways*

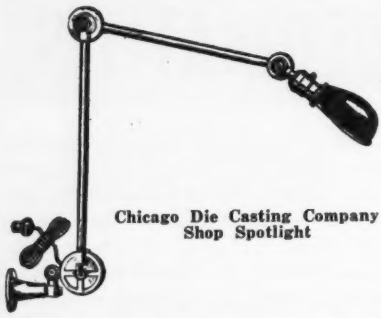
**They're made from Quality Steel. They're correctly designed — accurately made — hardened by the finest equipment obtainable. They're EASY TO GET because they're stocked in principal cities. They're THE ORIGINAL DOUBLE-END MILLS.**

*Ask Your Nearest Weldon Representative for Prices*

**THE WELDON TOOL CO.,** 321 Frankfort Ave., Cleveland, Ohio

## Shop Spotlight

The illustration shows a shop spotlight that has been brought out by the Chicago Die Casting Mfg. Co., 2512 West Monroe St., Chicago, Ill., for use in factories and other places where light is needed at the point of work. The lamp is easily attached to the wall or bench, is convenient and easily adjustable, and can be swung out of the way when not needed.



Chicago Die Casting Company Shop Spotlight

The lamp consists of a three-arm assembly so constructed as to maintain pressure by merely adjusting nuts to tighten or loosen the flanges. Friction washers are used on the small joints where the pressure is at a minimum. The large joint is equipped with die cast flanges which are especially tough and wear-resistant. The arms are of heavy steel tubing, and the lamp is constructed to comply with the most rigid building and electrical codes. The arms and joints are gray and the lamp shield is dark green. The maximum extension is 36 inches from the point of attachment and the lamp is 100 per cent adjustable in all directions.

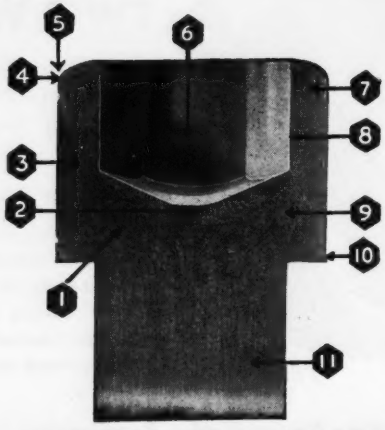
## "Namco" Circular Chaser Die Heads for Brown & Sharpe Automatic Screw Machines

The National Acme Company, Cleveland, Ohio, announces a new line of self-opening die heads for Brown & Sharpe Automatic Screw Machines with either milled or ground thread circular chasers. These tools are hardened and ground throughout and are of the pull-off type with safety release. Each part of the die head is made of a special alloy steel, specially heat treated and precision ground, which insures long wear under


FIBRO FORGED SCREWS

TRADE MARK

1 Increased Strength
2 Core Fibres, Uncut
3 Continuous Fibres
4 No Tool Marks
5 Concentric, Head and Body
6 Improved Socket
7 Continuous Fibres
8 Re-enforced Socket Wall
9 Continuous Fibres
10 Square Shoulders
11 Original Continuous Fibres



The results of an entirely new and better method of

SOCKET SCREW manufacturing

*FREE*, enough screws for a test.

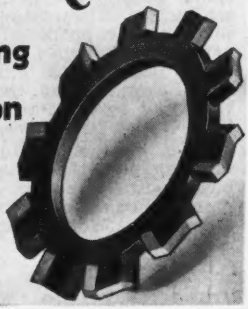
*Write Dept. H, giving size.*

*Patented by* **HOLO-KROME**

Main Office and Plant, Bristol Conn., U. S. A.

## If You've Never Used *Everlock* Washers

**A Startling Revelation Awaits YOUR First Test**



**. . . There must be a reason why engineers everywhere are recommending Everlock Washers. There are TWO reasons—GENUINE POSITIVE LOCKING and POWERFUL SPRING TENSION . . . Performance unequalled by any lock washer we have ever seen.**

Unretouched photo shows marks made in nut by sharp projecting edges of Everlock Washers.

**If you could come to our plant and see reports of impartial tests made by outside engineers you would quickly see what we mean by unequalled performance. BUT WAIT, YOU CAN DO THE SAME THING IN YOUR OWN PLANT.**

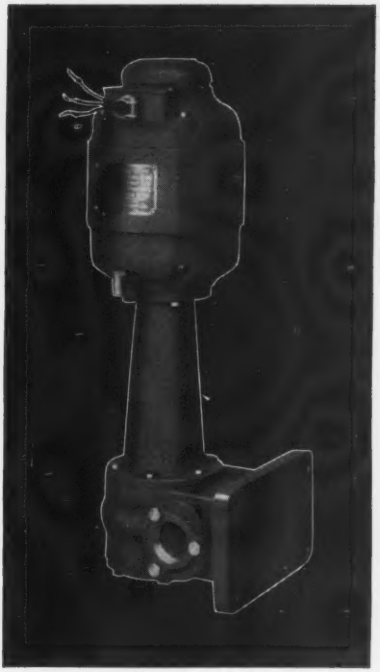
Just write for samples. Test them against the best lock washers you ever saw. Then you will appreciate what we mean by GENUINE POSITIVE LOCKING and POWERFUL SPRING TENSION.

*Everlock*

**Thompson, Bremer & Co.**

1640-E West Austin Ave., Chicago, Ill.

## Where The Best Is DEMANDED



## Ruthman *Gusher* Pumps are used

The Ruthman Gusher Coolant Pump is modern in every respect. Its compact design permits installation in a small place . . . . having few parts, it is trouble-free! Built by the pioneer of the vertical packless motor pump, it is now installed as original equipment by more than 80 machine tool builders! It will pay you to investigate Ruthman Gusher Pumps now! Write for details.

GUSHER COOLANT PUMP

THE RUTHMAN MACHINERY CO.

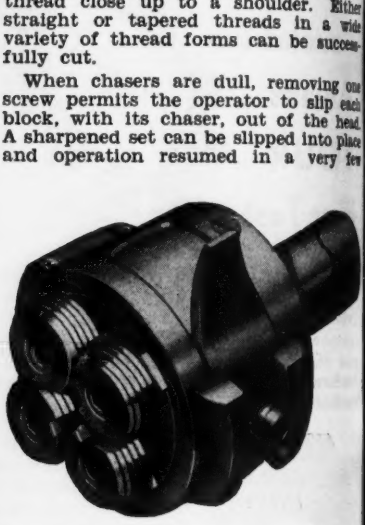
536 E. FRONT ST. CINCINNATI, OHIO

THIS NEW
LIGHT
INCREASES
MACHINE
OUTPUT
Eliminating glare and reducing eye strain by the properly engineered, easily directed, high intensity illumination of the Fostoria Machine Lamp, insures increased production, less spoilage and few accidents . . . . In one plant, savings by increased production alone, paid the complete cost of new equipment in 90 days. In another, output of machines was increased 21% . . . . A study of your requirements will be made by a Fostoria representative — no obligation.
MACHINE
fostoria
LAMP
The Fostoria Pressed Steel Corporation
Ind. Div.
Fostoria, Ohio
POINTS ANYWHERE
FRONT
REAR
SIDES
UP
DOWN

hard service without loss of rigidity.

The parts are entirely interchangeable and can readily be replaced in case of accident or breakage. Chasers are mounted externally to the head so that the cutting actions does not take place inside of the die head proper. Chips are thrown outward and do not interfere with the free operation of the die head parts which also makes it possible to thread close up to a shoulder. Either straight or tapered threads in a wide variety of thread forms can be successfully cut.

When chasers are dull, removing one screw permits the operator to slip each block, with its chaser, out of the head. A sharpened set can be slipped into place and operation resumed in a very few

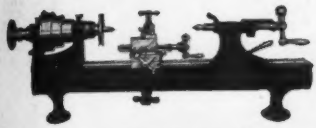


**"Namco" Circular Chaser Die Head for B & S Screw Machine**

seconds. This quick change reduces idle time on the machine and is possible only because of the "Namco" method of sharpening the chaser on its block and checking each grind with the National Acme Micrometer Gauge before placing it in the die head. Sharpening of chasers does not change the length of thread because the die chaser is always in the same relative plane until the entire circumference of the chaser has been ground away.

Each chaser is essentially a circular forming tool and has a heavy body of metal back of the cutting edge which carries away the heat of cutting very effectively. An added advantage is the fact that the chaser can be repeatedly ground until the entire periphery has been used up, which accounts for its long life and numerous grinds. It is a simple matter to change from right to left hand thread, using the same chaser

"Stark"



**NEW No. 5-NOTHING LIKE IT**

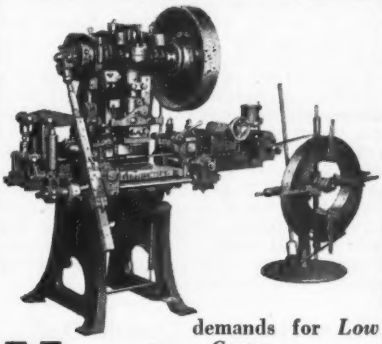
- The largest Precision Bench Lathe—Swings 12", Collet Capacity 1 ¼". Weighs about 385 pounds.
- Husky, Powerful, but extremely accurate—it saves time on die and tool work, chucking, boring, grinding.

Stark Motor Drive Unit or Countershaft.

- Also with Automatic Turret Head—fast Lever Chuck Closer and fast feeds for manufacturing.
- Five smaller sizes with complete precision equipment.

STARK TOOL COMPANY
Estab'd. 1862
Waltham, Mass.

*Originators of the American Bench Lathe*



**Meet** demands for *Low Costs. Delivery* dates. the *Liability* insurance man with a smile.

Use Littell Punch Press Feeds for Safety & Speed

**F. J. LITTELL MACHINE CO.**
4127 Ravenswood Avenue, Chicago
*Mfr's of Punch Press Feeds & Reels*

**For the QUICK TURNING OF NUTS use the FAVORITE REVERSIBLE RATCHET WRENCH**

**Now Made of a Stronger and tougher metal**

•

*A Time-Saver*

•

*Send for Full Particulars*

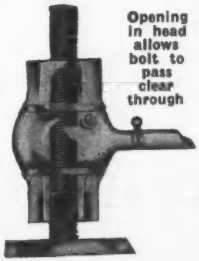
The new metal now used in Handles, Heads and Pawls enables the "Favorite" to stand up under harder and rougher usage.

Ratchet movement eliminates all lost motion. Does not leave the nut until operation is completed.

Can be used in narrower places than an ordinary wrench.

Each head can turn two different-size nuts. One in each end.

**Works on a Quick Straight-Ahead Ratchet Movement**



Opening in head allows bolt to pass clear through

**GREENE, TWEED & CO.**
*Sole Manufacturers*
109 Duane St., New York

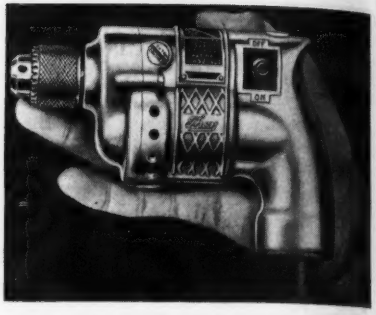
by simply changing the chaser from a right to a left hand chaser block and grinding on the opposite face of the chaser.

Arrangement is provided to allow for lateral compensation due to variation of lead of cam and can be adjusted to suit local conditions. Closing attachment is usually located so that the die head is closed when turret is indexed to operating position. This eliminates any possibility of die head opening when the turrett is indexing. These die heads are made for all sizes of Brown & Sharpe Automatics and have a minimum cutting capacity of 0.056 inch.

## Thor No. U-14 Electric Drill

What is said to be the smallest electric drill ever built—the Thor No. U-14—has been placed on the market by the Independent Pneumatic Tool Company, 610 West Jackson Boulevard, Chicago, Ill. The capacity of the drill is ¼ in. in steel and the weight is 2½ lbs. It is 6¾ in. in length overall and operates at a free speed of 2500 r. p. m. The drill can also be supplied to operate at a free speed of 3750 r. p. m. but the drilling capacity is 3/16 in. steel.

Noise and vibration have been reduced



Thor No. U-14 Electric Drill

to the minimum in this tool by the use of high grade ball bearings and accurately machined heat-treated helical gears. Heat generated in the tool is reduced to the minimum by the use of a patented ventilating system, indirectly increasing the power through ability to pull a heavy load without overheating. The design of the drill permits the use of long carbon brushes which assure long life and service. The same hand wound armature and commutator construction is incorporated in this drill

SYRACUSE D NEW YORK

THIS MARK

The sign of DEPENDABLE ACCURATE GEARS of all TYPES and MATERIALS for all kinds of MACHINE TOOLS and FOR POWER TRANSMISSION EVERYWHERE.

Will be found only on GEARS made by

Diefendorf Gear Corporation

Syracuse, New York

# THE HEART OF THE TOOL

**The spindle is the most important part of any machine tool. That's why machine tool builders are so particular about their spindles and use American Hollow Bored products. They are sure of high quality, dependable forgings and quick service. Get complete information on our spindles, shafts, rams, and hydraulic cylinders.**

*Write for prices.*

**American**
**Hollow Boring Co.**
**2000 Raspberry St.**
**Erie, Pennsylvania**

# CYLINDRICAL SUB-PRESSES

ARCH TYPE

May be adjusted for wear and so perfect alignment can be maintained. This means that the equality of the punchings will not vary and that the life of the dies is increased. Nine diameters of plungers in arch and overhang types in stock. Ask for booklet on Sub-Presses and Dies.

**Waltham Machine Works**
**WALTHAM, MASS.**

# YOU CAN COUNT ON HASKINS EQUIPMENT

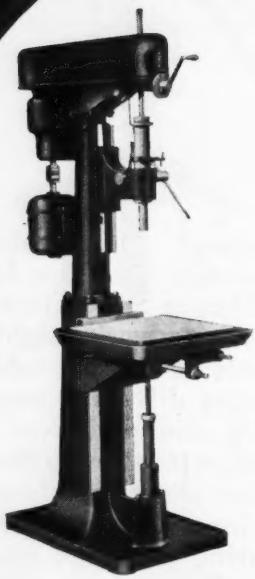
**Grinding? Polishing? Cleaning? Wire Brushing? They're all just part of the day's work. Light and portable . . . easily adapted for many different uses . . . quickly changed over from one operation to another . . . flexible shaft machines of amazing utility that cut operating costs and increase plant efficiency.**

*Send for Illustrated Booklet*

**In scores of industries Haskins flexible shaft equipment is effecting huge economies and stepping up production output . . . It may do the same in YOUR plant. Why not investigate? Write today for illustrated booklet showing many different models, interesting operation pictures and scores of unusual uses to which this machine has been adapted. R. G. Haskins Company, 4667 West Fulton Street, Chicago, Ill.**

**Haskins**
**FLEXIBLE SHAFT EQUIPMENT**
*with Greater Adaptability*

FOSDICK



SENSITIVE ECONOMAX

Ideal for fast, accurate drilling. Speed-box on vertical back shaft is equipped with hardened alloy-steel gears and anti-friction bearings running in lubricant. No belt-shifting mechanism. Gear change lever is located directly in front of operator. Six spindle speeds. Capacity from ½" to 1½".

*Write for Bulletin MS3*

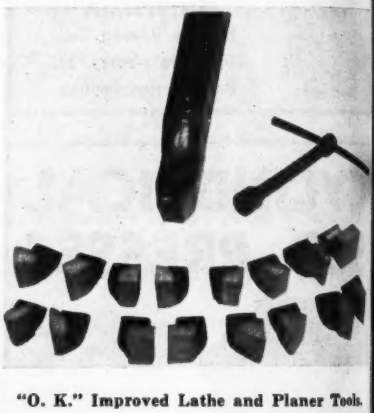
THE FOSDICK MACHINE TOOL CO.
CINCINNATI, OHIO

which is used in the larger Thor tools. The tool is equipped with a Jacobs chuck and carries as regular equipment one set of extra brushes enclosed in a special compartment in the housing.

## "O.K." Improved Lathe and Planer Tools

The illustration shows a set of the improved lathe and planer tools that are now being marketed by the O. K. Tool Co., Shelton, Conn. As in their previous tools of this type, the bit is separate and adjustable, but the adjustment is now accomplished by means of a system of mating serrations, which is the same principle that has been employed for years in the milling cutters made by this firm.

By means of the locking clamp, the toolbit is locked rearwardly against a slanting shoulder or angular mating surface in the holder, and downwardly into

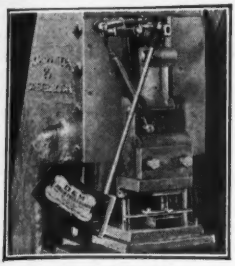


"O. K." Improved Lathe and Planer Tools.

a bottom angular serrated mating surface. This design is said to eliminate all possible sidewise or lengthwise tipping of the toolbit and does not throw the strain onto the locking clamp. By loosening the clamp, the bit may be adjusted laterally to compensate for grinds taken off or to conform it to the exigencies of the work.

All O. K. toolbits are so formed, however, that it is seldom necessary to grind more than the top surface. The bits are of the best high speed steel, drop forged and correctly heat treated. Holders are of chrome nickel alloy, drop forged and specially heat treated for toughness.

## Guard Fingers
**this convenient way**



It takes only one mistake on a punch press to cripple the hands of an operator. There is no substitute for dependable safety appliances. Reduce the accident hazard by installing D. & M. Automatic Punch Press Guards. Dependable, economical, easy to install.

**Install one for 30 days at our expense. It will satisfy you or there is no obligation. Give name, size and stroke of press.**

**TAYLOR-SHANTZ CO.**
480 ST. PAUL ST. ROCHESTER, N. Y.

## COLONIAL DRILL JIG BUSHINGS
A. S. A. STANDARD

You are sure of getting accurate and dependable drill jig bushings when you order COLONIAL. Made of High Grade Tool Steel. And when you order COLONIAL, you'll get them quickly.

Write for Specification Sheets and Prices

**COLONIAL BUSHINGS, Inc.**
145 JOS. CAMPAU ST.
DETROIT, MICH.

## LEAK-PROOF TROUBLE-FREE

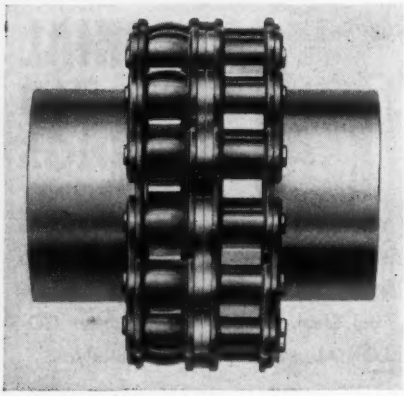
**The Q.A.W. valve principle defies wear. It is virtually foolproof—applications are simply and easily made—shutdowns for repair or leakage unknown—25,000 units in numerous combinations in daily use are constantly proving Q.A.W. superiority on air or water control jobs for both low and high pressures. Q.A.W. simplicity lends itself to inexpensive control—balanced smooth operation—safety inherently built. We'll gladly make suggestions without obligation.**

**CATALOG** (loose leaf) with **ENGINEERING DATA** compiled to include your needs if you mention these when writing.

*Quick-As-Wink Control*
FOR AIR **VALVES** FOR WATER

**C.B. HUNT & SON - SALEM, OHIO**
DISTRIBUTORS IN PRINCIPAL CITIES

Representative in England: Gaston E. Marbaix, Ltd., London.



Baldwin-Duckworth Flexible Coupling

## Baldwin-Duckworth Flexible Coupling

The flexible chain coupling illustrated has been designed by the engineers of the Baldwin-Duckworth Chain Corporation, Springfield, Massachusetts, to provide for free operation and the utmost flexibility, without friction and excessive noise. This is said to be accomplished by the use of special double width roller chains. One strand of the chain is equipped with the standard cylindrical rollers, whereas the other strand has convex surface, oversize rollers which provide for free operation where shaft deflection and misalignment exist. Permanent shaft deflections up to three degrees can be handled without undue strain, thus taking care of shaft joints where wobble or permanent eccentricities prevail.

The coupling is said to be highly economical because it is self-aligning and does not require the added cost of the oil-tight case or housing. The special heat treated convex rollers operate freely on the hardening sprocket teeth without binding or undue wear.

## Apex Tools For Heavy Machine Work

The illustration shows an inserted tool which has been developed by The Apex Tool & Cutter Co., Inc., Shelton, Conn., for planing frog and switch rails and crossovers and for other similar heavy

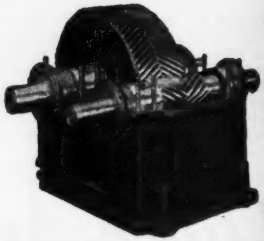
Columbia
TOOL STEEL

Non-users often fail to appreciate the extra worth built up under the banner "Good Tool Steel". A trial will soon show the difference.

It pays to use Good Tool Steel

COLUMBIA TOOL STEEL COMPANY
MAIN OFFICE AND WORKS
7600 E. 14TH STREET, CHICAGO HEIGHTS, ILLINOIS

FARREL-SYKES "The Gearbox is a Backbone"



FARREL-SYKES GEAR UNITS

For speed reducing or speed increasing. Any horsepower from 1 to 10,000. Any ratio from 1/1 to 300/1.

Meet all requirements for uniform, silent, positive, efficient transmission of power.

Catalogs and engineering data on request.

FARREL-BIRMINGHAM COMPANY, INC.
381 Vulcan Street, Buffalo, N. Y.

QUALITY BELT LACING

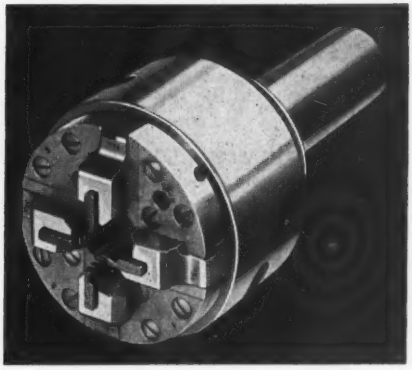
# Clipper Carded Belt Hooks

*Safest* to handle
*Safest* in operation

For lasting belt joints modernize your lacing equipment -use Clipper

**Clipper**

Belt Lacer Company
Grand Rapids, Michigan



## at the BIG SHOW in CLEVELAND

See the new H & G Die Head with Insert Chasers —the greatest advance in thread cutting since the self-opening die head. The very low price together with extra long runs obtained results in new low chaser costs per thousand pieces threaded. Simple design permits the replacement of worn chasers in a few minutes. The down time of the machine is less and the daily net production is higher. Bring your threading problems to the Show, Booth 900.

**STYLES OF INSERT CHASER DIE HEADS AVAILABLE**

**STYLE MM** for rotary spindles.

**STYLE MS** for hand turret machines.

**STYLE DM** for B & S Automatics and other small single spindles.

**STYLE IMM** is equipped with improved internal trip for shoulder threading such as for spark plugs.

**STYLE TM** has receding chasers for cutting superior quality taper threads.

**STYLE SAM** Solid Adjustable using low cost insert chasers.

**GENERAL PURPOSE DIE HEADS**
using the famous H & G Hobbed chasers

**STYLE EE** (Rotary). For automatics, threaders, etc., where the die head rotates.

**STYLE C** Hand Closing for hand turret machines.

**STYLE D** for Brown & Sharpe Automatics and other small machines.

*Write for literature*

H & G DIE HEAD

**The Eastern Machine Screw Corp.**

38-58 Barclay St. New Haven, Conn.

**ACE SPOT WELDERS**

**1,200 WELDS PER HOUR**
Continuously on 24 Ga. Welds from 24 to 16 Ga. For production or general utility.

**PRICE, ONLY $47.50**

Sample welds and literature upon request.

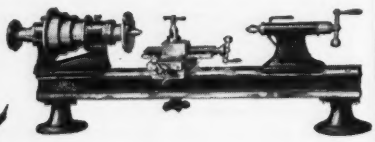
**PIER EQUIPMENT MF'G. CO.**
1276 Milton Street,
Benton Harbor, Mich.

**RIVETING?**
**LINLEY NOISELESS ROTARY RIVETING MACHINES**

Assure Peak Production and Lower Maintenance. Rigid and Powerful. Bench and Floor Types. Motor or Belt Driven. There is a Linley machine for every riveting job.

**Send Samples of your Work and we will furnish accurate estimate of production and quote cost of equipment.**

**LINLEY BROTHERS CO.**
583 Fairfield Avenue
Bridgeport, Conn., U. S. A.



*It's an* **AMES**
**"DUAL-USE" BENCH LATHE**

"Because of its special design, I can use this Ames bench lathe to make interchangeable parts and for the very finest tool and instrument work.

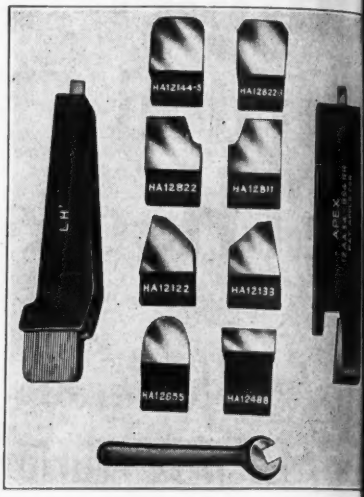
**"Here's what lets me do it, easily . . ."**

1. Cast iron bed machined all over
2. Very accurate alignment of headstock and tailstock centers
3. Straight bearings for hardened spindles with adjustments for side play and end thrust
4. Ball-bearing spindle end thrust

**Why be content with less when you can have an Ames? Write for the blue catalog with complete facts. Address Department M M. Bed 36"—Chuck capacity 5/8" or 1" Swing over bed 8 3/8" Maximum distance between centers 21"**

**B. C. AMES COMPANY**
WALTHAM, MASS.


work. The illustration shows the offset holder, both right and left hand, the offset on these tools being sufficient to enable them to be operated together as they come close enough to permit of proper spacing or sizing of widths of rails. The holder is made with a hardened seat with milled serrations which mate with serrations on the bottom of the tool bit. The tool bit is locked in the holder by means of the double-acting draw-bolt screw which binds the




**Apex Tools for Heavy Machine Work**

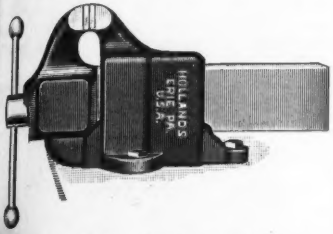
tool bit securely back on the seat of the holder and mates on three sides of the slot. All of the different type tool bits can be used in the holder without removing the holder from the machine by simply releasing the lock at the top of the holder.

All tool bits are ground with 10 deg. front rake and 2 deg. side and bottom clearance. They are ground on top as required, thus maintaining their shape with a minimum of waste. Special formed shapes can also be had for use in the standard holders or special holders are made for other classes of heavy work.

## B & S Surface Plate Square

The Brown & Sharpe Mfg. Co., Providence, R. I., has announced the inclusion in its line of a new Surface Plate Square the No. 559, which has some very nov

# MODERNIZE
## Your Vise Equipment




Worn out, obsolete vises increase labor costs. Choose new vises — Holland vises — the result of 50 years' experience in building these quality products.

*May we send our catalog?*

**Hollands Manufacturing Co.**

Est. 1887 Erie, Pa.

# NEW!
## SHOP SPOTLIGHT

**100%**

ADJUSTABLE LIGHT FOR USE IN ALL FACTORIES—SHOPS OFFICES

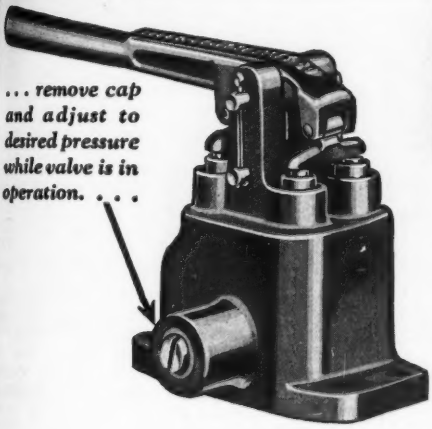
**Models for Wall, Bench, Punch Press and Drill Press.**

Price F. O. B. Factory

SINGLE LOTS $3.25 each
LOTS OF SIX $2.90 each

**CHICAGO DIE CASTING MFG. CO.**

2504 W. MONROE ST. CHICAGO, ILL.



*... remove cap and adjust to desired pressure while valve is in operation. ...*

# Ross Two-Pressure Valve

THIS New ROSS Two-Pressure Valve is based upon the principle that the actual pressure required for the idling stroke of a piston in a cylinder is much less than that required for the work stroke. Thus a material saving is created with this new valve which provides full line pressure on the work stroke and selected reduced pressure on the idling stroke.

Write for- Complete Details in New Catalog

**ROSS OPERATING VALVE CO.**
6488 EPWORTH BLVD.
DETROIT MICHIGAN

REED KNURLS

123 Styles and Sizes

Highest quality, accurately cut Standard Stock Knurls ready for immediate shipment. Reed Special Finishing Process after hardening insures longest wearing Knurls producing best work. Special Knurls made to specification. Send for Circular.

REED SMALL TOOL WORKS,
40 DEWEY STREET, WORCESTER, MASS.

"Alnor" PYROMETERS

For the Hardening Furnace

Price complete without protection tube. $13 to $36.00 and up

Write for Information

ILLINOIS TESTING LABORATORIES, Inc.
146 W. Austin Ave. CHICAGO, ILL.

PUTNAM
HI-SPEED
END MILLS

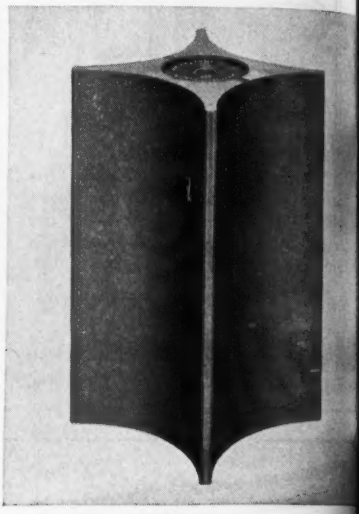
Superior quality produced by methods accumulated thru many years of fine tool designing and manufacturing assure you of—Maximum Production—Higher Speeds—Faster Feeds—Smoother Finish.

*Send for Catalog*

PUTNAM TOOL COMPANY
2981 Charlevoix Avenue
DETROIT, MICHIGAN

and useful features of design.

The square, as will be noted from the accompanying illustration, has both ends square with the sides. It is substantial and rugged and of a form most convenient for use on a surface plate. The one-piece construction is not subject to changes from handling and from small variations in temperature. The weight



B & S Surface Plate Square

and shape are such that it is not easily upset.

The square is made of hardened steel 4 in. high and is approximately 3 in. between opposite edges.

## "Bonney" Handy Holding Tool

Bonney Forge and Tool Works, Allentown, Pa., have brought out a handy screw-holding, gripping, inserting, removing, and picking-up tool. The tool is intended for use where screws, washers, nuts, bolts, taper pins, valve pins and similar objects are employed in manufacturing or repair operations.

The tool consists of four fingers on a tube, which operate within a second tube. The four fingers open to grasp the object when pressure is brought on the plunger, as shown in the illustration. On release of the pressure, the strong spring causes the fingers to close tightly around the object. The object is then

**PRECISION TAPPING**
with the New
**"PROCUNIER"**
HIGH SPEED, BALL BEARING
**TAPPING ATTACHMENTS**

**Smoother--More Sensitive--Compact**

Double-Cone, Long Life, Cork Faced, Friction Clutch.
Three Sizes With Capacities up to ½" in Steel.
Also other Styles and Sizes.
Write for Literature.

**PROCUNIER SAFETY CHUCK CO.**
1200 CLINTON ST. CHICAGO, ILL.

**MENDES QUALITY DIAMONDS** *Always Sharp*

"DIAMOND"POINT
*ANGLE TOOL*
for
WHEEL DRESSING

REDUCE GRINDING COSTS

FOLDER M ON REQUEST

**Mendes Cutting Factories, Inc.**
DIAMONDS AND DIAMOND TOOLS
505 Fifth Avenue, New York, N. Y.
Rep.: Milwaukee, Indianapolis, Cincinnati, Pittsburgh, Baltimore

*Watch Your* **PRODUCTION STANDARDS**

More closely duplicated parts, smoother assembly, less waste, more customer satisfaction, is obtained in progressive shops by using Federal Indicators and Gauges. Ask for catalog 37.

**FEDERAL** DIAL INDICATORS and PRECISION INSTRUMENTS

FEDERAL PRODUCTS CORP. Providence, R. I.

Bonney Handy Holding Tool

turned out or removed.

The Bonney Handy Holding Tool is made in three sizes with 4-in., 6-in., and 8-in. reach. It is finished in full nickel.

## "GreaSeal" Felt Protected Precision Ball Bearings

The Norma-Hoffman Bearings Corporation, Stamford, Conn., announces th its "Greaseal" line of Felt-Protect Precision Ball Bearings has been extend three of these "GreaSeal" types are no and 50 millimeter bore.

The "GreaSeal" line includes thr series: "7000," with single felt se "7000-P," with single felt seal and pl shield; and "77000," with double fe seal. The two latter series are fu enclosed for retention of lubricant a exclusion of dirt and moisture. A three of these "GreaSeal" types are no contained units distinguished by the n movable felt seal consisting of thi closely-fitting felts between removab plates, forming an effective labyrin against the recessed inner ring. Th felt seal, being completely within th confines of both rings, is not expos to injury.

The wide, solid inner and outer rin of "GreaSeal" bearings make inserts the housing unnecessary, and safegua against looseness, slippage, and esc of lubricant past the outer ring. Th seal construction is such that all distor tion of the ball races is avoided. Th with extreme precision, makes for qu running. The grease capacity in three "GreaSeal" types is ample for lo periods of service, without renewal.

**The Mummert-Dixon Spot Facer**

. . . enables you to machine accurate and smooth surfaces on small bosses, etc., in less time than by any other method. Better investigate! Send for a bulletin.

**MUMMERT-DIXON CO.** 120 Philadelphia St. HANOVER, PA.

**PISTON RINGS**

Step Cut—Angle Cut—Butt End
From 1" to 16" diameter

Prompt service on large or small quantities, for Original Equipment and Maintenance.

*(Special sizes to order)*

**The Auto-Diesel Piston Ring Co.**
1430 East 32nd St., Cleveland, Ohio

**CLEAN Machinery is SAFE Machinery . .**

**The CLEMENTS —CADILLAC**

**BLOWER — SUCTION CLEANER — SPRAYER**

Really **CLEANS** any motors or intricate machinery—thoroughly, safely. Drives **DRY AIR**, free from oil or moisture at great velocity but low pressure. Removes dust, lint, wood or metal particles — reducing risk of "shorts" and "burn-outs", cuts down fire hazard and excess wear. Convertible to sprayer or suction cleaner.

**CLEMENTS MFG. CO.,** 6655 South Narragansett CHICAGO, ILL.

Ask for **FREE** Trial

# GOOD DIAMONDS

*Have no economical substitute*

If your tools are marked like this, you have the best. Write for our illustrated catalogue on Diamond Tools.

J.K.SMIT SONS

**J.K. SMIT & SONS, Inc.**

*Importers of Diamonds*

57 CHAMBERS ST., NEW YORK CITY
400 TIREMAN AVE., DETROIT, MICH.
AMSTERDAM LONDON BAHIA

# More Holes per Minute

And a better profit for you . . . that's the result of applying U. S. Multiple Units to your drilling machines.

By specializing in the design of special Drill Head Units, we can easily meet your requirements of accuracy and economy.

**Send blue prints for estimates.**

**The United States Drill Head Co.**
1954 Riverside Drive
CINCINNATI, OHIO

## Now You Can Buy Diamond Dressing Tools that are Guaranteed!

Koebel Multi-Point Tools provide a number of small, whole, natural diamonds set in spaced relationship: from two to five sharp diamonds in contact with the wheel, each taking its share of the total burden. This permits faster traverse, a finer, more uniform dressing, providing a higher work finish, more parts per dressing, and longer wheel life. They will hold-size for any width of face.

**No re-setting is ever necessary.** The Diamonds are mounted in Koebelite (patented process) guaranteed to hold them rigidly for their entire useful life. The metal will not load or glaze, but grinds away freely as the diamonds wear.

## SEND FOR THIS FREE BOOK

A brand new "easy-to-take" type of instruction book, full of right-to-the-point information about how to get more and better work from your grinding wheels. Your copy will be mailed free upon request.

KOEBEL DIAMOND TOOL CO.
1202 Oakman Blvd., Detroit

# KOEBEL
## DIAMOND TOOLS

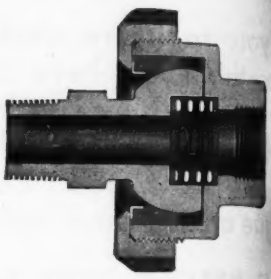
**EISLER SPOT WELDERS**
½ to 100 K. V. A.
ELECTRIC SAW BRAZING MACHINES, BUTT, WIRE, PORTABLE AND SPECIAL WELDERS
Welders as low as $35.00
Submit Samples for Test.
No Obligation.
**Eisler Engineering Co.**
742 S. 13th St., Newark, N. J.
Dealers Wanted.
Write Chas. Eisler, Pres.

**A New Keyseater**
**With Tilting Table For Either Straight Or Tapered Bores**
*Send For Circular*

**Davis Keyseater Co.**
Exchange and Glasgow Sts.
Rochester, N. Y.

## Barco Type M Swivel Joint

The Barco Manufacturing Compa 1801 Winnemac Ave., Chicago, Ill., h added to its line of ball and swi joints the Type M Swivel Joint sho in the illustration. The Type M joi is especially intended for use on plat



Cross-Section View of Barco Type M

presses, tire and tube molds and simil machinery, to connect piping betwe moving parts.

It will be noted from the illustrati that the design of the Type M joint i cludes a metal washer or bearing at e end of the spring, thus eliminating t spring wear on the two major parts the joint; viz, the ball and casing. T improvement not only prolongs the l of the major portions of the joint b also greatly reduces the possibility spring breakage.

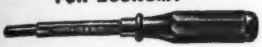
## Flexoid Industrial Shaft Coupli

The Smith Power Transmission C 1213 West Third St., Cleveland, O has brought out a high speed flexi coupling of sturdy construction, wh has no metal-to-metal bearing surfa

**. . . for more than 1001 odd jobs**

**The Hjorth Bench Lathe has th speed, accuracy, handling con and dependability that appeal t every operator. That's why you find the better shops equippe with the Hjorth Lathe.**
*Write today for data a prices.*
HJORTH LATHE & TOOL CO., 12 Beacon St., Woburn, Mass.

## DIAMOND TOOLS
FOR ECONOMY



All types for dressing grinding wheels. Shaped Diamond Tools, etc. Large stock unset stones on hand. Resetting and resharpenings returned same day received.

Send for price list and specify your requirements.

**E. KARELSEN, INC.**
Established 1852
15 West 44th St., New York, N. Y.

The Famous "FOUR GRIP" Rigid Tool Bit Holder . . .

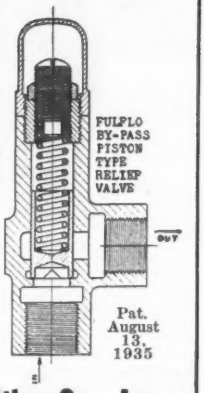
for Standard Commercial and Tungsten Carbide Tipped Bits. Also rigid cutting-off blade holders.

Circular on request.

**FOUR GRIP TOOL CO.**
109 E. 17th St. Paterson, N. J.

## FULFLO Non-Chattering By Pass Piston Type Relief Valve

THIS valve is made in pipe sizes from ⅜ to 3" and is suitable for pressures from 10 lbs. to 1,000 lbs. Adjustment can be made by removing cap and turning adjustment screw at top of valve. The cylindrical piston seat closes off the port in a shearing manner, and does not seat abruptly against the body of the valve, thereby, relieving a pounding or chattering noise as ordinarily caused by standard valves using a disc seat.




Pat. August 13, 1935

**Fulflo Specialties Co., Inc.**
BLANCHESTER OHIO

# • • UNIVERSAL • •

## STANDARD DRILL BUSHINGS

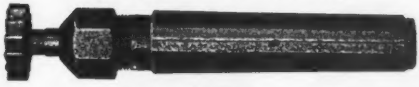
A. S. A. Specifications

LONG LIFE

LOW COST

## COLLET CHUCKS for End Mills

## KEYWAY CUTTERS



AND

## NITRIDED CENTER POINTS

**UNIVERSAL ENGINEERING CO.**
FRANKENMUTH, MICHIGAN

requires no lubrication and is impervious to the action of oil, water, or grit.

The unit will operate either horizontally or vertically, has no back lash, and is said to operate without noise indefinitely. It also absorbs vibration and shocks and operates satisfactorily when used with a floating shaft.

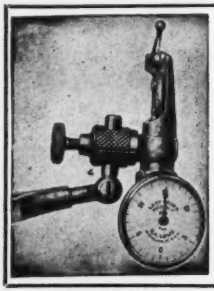
**Flexoid Industrial Shaft Coupling**

## Corinco Isolation Corkboard

As a result of research and study through the past few years, it is generally becoming recognized that vibrati aside from the fact that it is the dir cause of much noise, has a destructi effect upon machinery and build structure. This is particularly true the case of large, heavy machinery.

By controlling and reducing vibrati and noise, working conditions are i proved, the life of equipment is leng ened substantially, and a better qua of workmanship is made possible.

Cork, in its natural state, has certa absorption qualities which make it p culiarly fitted for use in reducing vib tian and noise. Accordingly, Cork I lation Company, Incorporated, 156 E 44th Street, New York, N. Y., is marke ing a material that is especially d veloped for the control and eliminati of unnecessary vibration, known as C inco Isolation Corkboard. This corkbo has a greater density than ordinary cor board, and is available in three den ties; light, medium and heavy. The densities are based on the number pounds of cork compressed into o board foot. For the light grade, t average is 1.1 pounds. This grade is d signed for use with small motors, fa etc. For the medium grade, the av age is 1.3 pounds. This grade is i tended for use with light machine

**LAST WORD**
**Precision Gages**

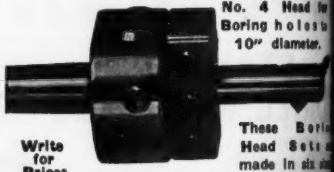
In your gaging work you demand indicators capable of close accuracy, wide adaptability, and long life. That's what you get in Last Word Indicators.

Write for Folder

**H. A. LOWE CO.**
**1875 East 66th St., Cleveland, Ohio**

**CRALEY OFF-SET BORING HEA**

No. 4 Head fo Boring holes to 10" diameter.

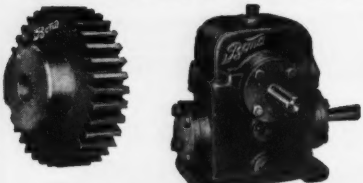


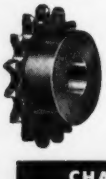
These Bori Head Sets a made in six si

Write for Prices

**C. C. CRALEY MFG. CO., SHILLINGTON,**

**THE EASIEST, QUICKEST, LEAST EXPENSIVE WAY TO BUY GEAR**

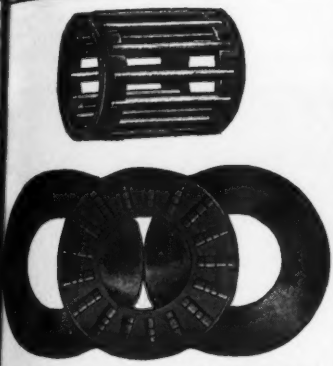




**ORDE FROM STOC**

**2,000** different sizes of BOND STOCK GEARS, SPROCKETS and SPEED REDUCERS are available for **immediate shipment from stock.** Handbook M-57 lists them all. Send for your copy today.

CHARLES Bond COMPANY
617-623 Arch Street, Philadelphia,



BALL THRUST BEARINGS
ROLLER THRUST BEARINGS
JOURNAL ROLLER BEARINGS

Special Bearings Made to Order.
Send Sketch or Sample for Quotation.
*Catalog Upon Request*

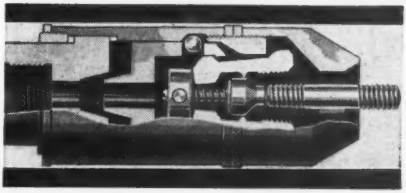
THE GWILLIAM CO.
358 Furman St., Brooklyn, N. Y.

The New Stackbin Section
Patented

MAKES A STOCKROOM AS EASY TO BUILD AS A SECTIONAL BOOKCASE

The Stackbin Section is designed so that one-section-nests-into-the-other, and sections nest deeply enough so that several placed one on top of the other provide a substantial unit. Ideal for temporary stockrooms near the job. Base separate. Counter top can be supplied. Write for circular and prices.

STACKBIN CORPORATION
TROY ST. PROVIDENCE, R. I.



High Speed Stud Setting
*The New Way*

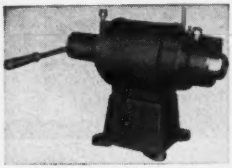
The Titan Stud Setter is a new self-opening type for driving stud bolts . . . it is full automatic in loading and releasing. It is a power driven unit adaptable to all types of drill presses and air or electric tools. Positive in driving and automatic in releasing, the studs may be set to any predetermined height desired and without straining or mutilating the threads.

The Titan Automatic Self-Opening Stud Setter provides most outstanding stud setting advantages. It will seat practically any type of stud and is adaptable to very successfully setting studs of extremely short lengths. It provides for increased production due to capacity, speed range and service . . . plus the added economy which its safety features assure by automatic operation. Write for new bulletin.

TITAN TOOLS

TITAN TOOL CO.
Fairview • Penn.

**IDEAL SPEED LATHES**



**FOR LAPPING**
**FINISHING**
**POLISHING**
**SMALL PARTS**

2 Speed Motor. Automatic Brake. Collet or 3 Jaw Chucks. Hand operated or automatic. Write for Cir. 351.

**SCHAUER MACHINE CO.**
905-7 Broadway Cincinnati, Ohio

**KEYWAYS**
**IN STRAIGHT OR**
**TAPER**

**HOLES** can be cut Quickly with **YOUR** Arbor Press and Our Cutters.

Bulletin on Request.

**THREADWELL**
**GREENFIELD, MASS.**

**THE NEW SHELDON 11" LATHE**

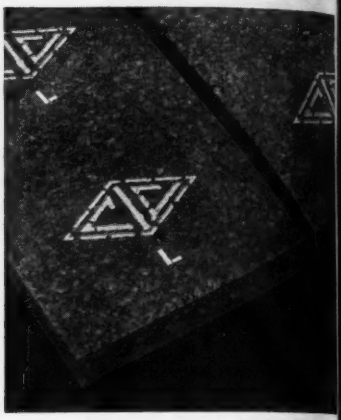
● 11¼ in. Swing . . . Two bed lengths . . . 24 and 36 in. center distances . . . 1 1/16 in. Spindle Hole.

Semi-quick change gear box with gears for cutting 4 to 80 threads per inch.

*Ask for Bulletin No. 23.*

**Sheldon Machine Co.**
3253 Cottage Grove Ave.
CHICAGO, ILLINOIS

medium sized generators, and machine of the medium grade. For the hea grade, the average is 1.6 pounds. Th grade is intended for all large hea



**Corinco Insolation Corkboard**

machinery, large motors, compresso etc. Corinco Isolation corkboard is ma in standard sizes of 12 x 36 inches, a 1, or 1½, 2, 3 or 4 inches thick.

## Cold Formed Flanged Heads

Cold formed Flanged heads for ada ing to pressure tanks, fans, blowers, a other metal parts, for either welded

**Chicago Metal Mfg. Co. Cold Formed Flan Heads.**

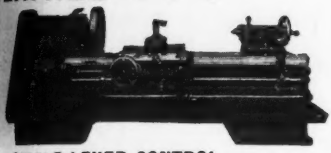
riveted joints, are now being made the Chicago Metal Mfg. Co., 3723 Rockwell St., Chicago, Ill. These flan are of uniform diameter for a gi size, and are smooth enough for rea application. They are said to be acc rate in every dimension, uniform

# Greenerd Arbor Presses

*Write for our Catalog 36 showing 64 different styles*

Greenerd Arbor Presses
NASHUA, N. H.

LATHES . . .

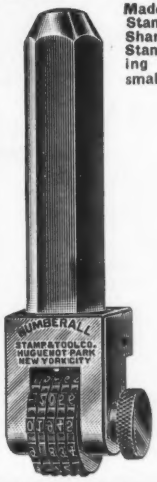


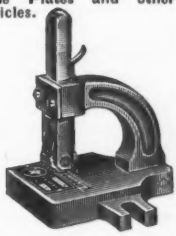
- SINGLE LEVER CONTROL
- CONE HEAD AND GEARED HEAD
- 14" TO 30" SWING

GREAVES-KLUSMAN TOOL CO. Cincinnati, Ohio

# Mark It Quickly with a NUMBERALL

Made with 1 to 8 wheels. Stamp in perfect alignment. Shank for Hand or Press Stamping. Platform for stamping Name Plates and other small articles.



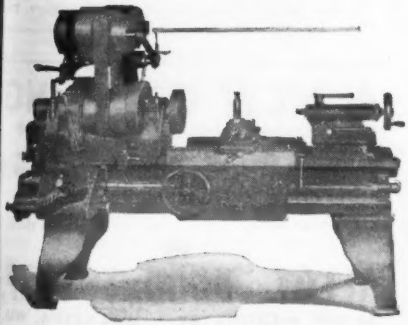
**NEW Quick Set Machine** One wheel can be turned quickly by knurled knob for consecutive numbering.

Reasonably priced

NUMBERALL STAMP & TOOL CO.
Huguenot Park,
Staten Island, N. Y.

# MODERNIZE . . .

. . . your Lathes, Milling Machines, Shapers and other cone pulley Machines with Cullman Individual Drives.



Made in sizes for motors ½ to 7½ H. P. Sold subject to your approval.

*Send for information*

**CULLMAN WHEEL Co.**
1336 Altgeld St.
CHICAGO, ILLINOIS

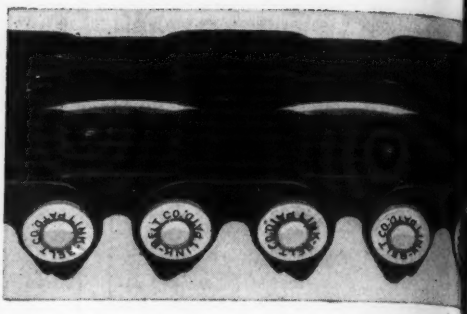
curvature, free from distortion and have a perfectly smooth surface that insures a tight joint.

The flanges are carried in stock in all standard sizes from 6 to 36 in. in diameter and larger sizes can be supplied upon request.

## Link-Belt "Silverstreak" Silent Chain

In keeping with today's trend toward the aesthetic in the design of even the commonest machinery part, Link-Belt Company, Indianapolis, Ind., announces that it has given a "new dress" to the Link-Belt Silent Chain Drive by bluing the chain and treating the washers and guide bars to give them a silvered appearance. The bluing of the bulk of the chain has the appearance of placing the silvered parts on a dark blue background, thereby imparting to the chain a distinct personality and making it as attractive as it is efficient.

The trade name "Silverstreak" has been adopted as a fitting designation in view of the fact that the chain gives the impression of a silvery streak when in operation. The chain has a distinctive appearance whether in motion or lying in stock. The chain is made in all standard types and sizes, for both industrial first reduction drives and for automotive silent timing. Types include side-flanged, middle guide, no back bond, and Duplex.



Link-Belt "Silverstreak" Silent Chain.


**FLYNN MICROMETER OFFSET BORING HEADS**

*Made in Various Sizes and Styles*

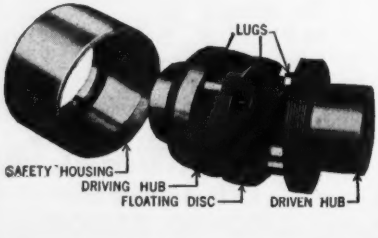
Send for Complete Information

**WATERSTON'S** 30 E. Larned St. Detroit, Michigan

**"NICHOLSON" EXPANDING MANDRELS**

THEY act like a four jawed chuck, expanding in the bores of collars, bushings, gears, pulleys, etc., and holding them securely while being machined in a lathe, miller, shaper or grinder. For bores from ½" to 7".

**W. H. NICHOLSON & COMPANY**
136 Oregon Street Wilkes-Barre, Pa.




**A NEW COUPLING**

1. Self-aligning
2. Perfect flexibility
3. Balanced for high speed
4. Highest efficiency even at maximum misalignment
5. Angular misalignment up to 6°
6. Parallel misalignment 1/16" to 3/16"
7. Runs on sprung shaft
8. Silent at all speeds

**ALLOY PRODUCTS CORP.**
221-241 MADISON ST. WAUKESHA, WIS.

Anderson Improved

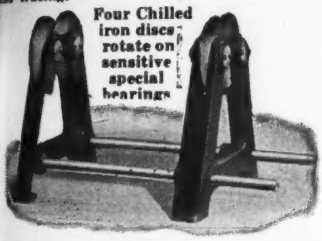
**Balancing Ways**

*No Leveling Required*

A simple and excellent device for balancing straightening and trueing.

They are made in the following sizes:

| Swing | Greatest Distance Between Standards | Capacity in lbs. |
|---|---|---|
| 20 in. | 20 in. | 1,000 |
| 40 in. | 30 in. | 2,000 |
| 60 in. | 30 in. | 2,000 |
| 72 in. | 66 in. | 5,000 |
| 96 in. | 88 in. | 10,000 |



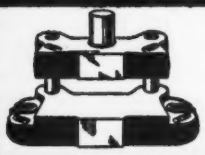

*Write for Full Information.*

Mfg. By **Anderson Bros. Mfg. Co.**

1926 Kishwaukee St., Rockford, Ill.



**BAUMBACH**



**STANDARDIZED DIE SETS**

SEMI-STEEL

DROP FORGED STEEL

Standardized Die Sets, embodying many exclusive features, and a listing of more than 95,000 stock sizes, afford a service that is unsurpassed.

*Send for Our New 208 Page Catalog*

**E. A. Baumbach Mfg. Co.**

1806 S. Kilbourn Ave., Chicago, Ill.



**ALL INDUSTRY DEPENDS ON**

**Mac-its**

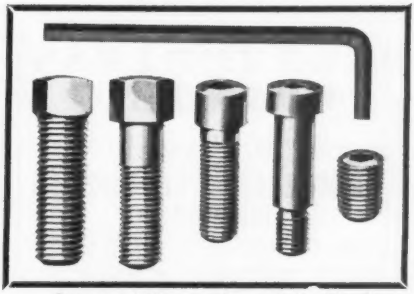
PRONOUNCED "MACK-ITS"

**. . . . FOR DURABILITY**

For a quarter of a century, Mac-its have been built to an inflexible standard of strength. That was the original Mac-it idea — Strength; and explains why Mac-it Screws are more DURABLE.

The DURABILITY OF MAC-ITS means screws that won't break, even when forced beyond reasonable limits; . . . hollow and socket screws that won't ream out . . . set screws that won't shear nor mushroom at the points . . . screw products that have in them the stuff that it takes to make them LAST!

*Write for "The Mac-it test."*



Representative members of the Mac-it family reading from left to right: Square Head Set, Hex Head Cap, Socket Head Cap, Socket Head Stripper Bolt, Hollow Set; and (at the top) Mac-it Long Wrench.

**THE STRONG-CARLISLE and HAMMOND CO.**

CLEVELAND, OHIO · · · NATIONAL DISTRIBUTORS

## Cutler-Hammer Bulletin 9101 Pushbutton Motor Starter

Combining distinctly modern appearance with a new, simple mechanism, the Cutler-Hammer Bulletin 9101 Push Button Motor Starter, made by Cutler-Hammer, 12th and St. Paul Ave., Milwaukee, Wis., is adaptable for almost any fractional horsepower application.

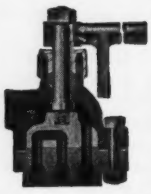
The switch provides protection against overloads with a free-tripping thermal overload mechanism. An overload is instantly indicated in the switch itself by the return of operating button to the "off" position. One operation pushing the "start" button resets th overload mechanism and restarts th motor.

The capacity of the switch can b varied to provide protection for differen

Cutler-Hammer Bulletin 9101 Pushbutton Motor Starter

sizes of motors by changing the heat coil. The coil is readily accessible fr the front of the switch by removing th cover plate and two screws. Some the other features of the new switch i clude solid silver to silver "twin-brea contacts, mechanism removable for wi ing, easily accessible terminals, no rusting mechanism, stainless ste springs, and top and bottom knockou

The switch incorporates extreme fle

**2,3 & 4-way VALVES**

For use on air, water, steam or oil for operating single and double acting cylinders, on pressures up to 300 lbs. Made in Lever, Foot and Solenoid Operated types.

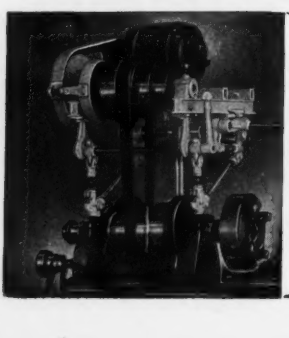
*Bulletins on request.*

W. H. NICHOLSON & CO.
136 Oregon St., Wilkes-Barre, Pa.

**CENTERLESS GRINDING**

*Accuracy — Prompt Service*

**COMMERCIAL CENTERLESS GRINDING CO.**
6538 CARNEGIE AVE., CLEVELAND

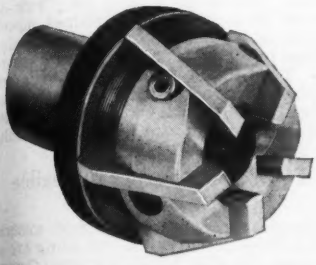


**REMCO MOTOR DRIVES**

Complete rigidity—no overhang—no strain on beds, frames, etc. Universal motor mounting—use any motor— not built special. change from one tool to another if desired. V Belt or Chain from motor. Complete guards—quick belt adjustment. Complete line of Drives from Hack Saws to 42" Lathes, etc.— Quickly applied.

*Complete Literature on Request*

**MANLEY PRODUCTS CORPORATION**
YORK, PENNSYLVANIA



## GENESEE ADJUSTABLE HOLLOW MILLS

*Are Cutting Costs Everywhere*

**SEVEN DIFFERENT STYLES**

**Have Genesee cut your costs. We design and manufacture hundreds of special and multiple operation production tools. Send samples or blueprints now. Write for catalogue.**

**GENESEE MFG. CO., Inc.**
**141 No. Water St., Rochester, N. Y.**

## • NEW An Inexpensive ABRASIVE BAND GRINDER . . .

*"Built Like a Machine Tool"*

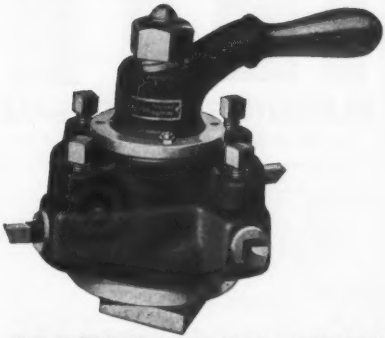
**The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on the belt. Ball bearing throughout, equipped with ALEMITE LUBRICATION, complete with grease gun.**

*Write for illustrated folder on this and other styles and sizes.*

**HORMEL-M GRINDER**
**WALLS SALES CORP.**
**96 WARREN ST. NEW YORK, N. Y.**

# Speed Up! McCrosky Turrets Can Help You

ON lathe jobs requiring two or more successive operations McCrosky Turrets can Speed Up your production. All tools are mounted at one set-up before job is started. Each tool can be quickly indexed into operating position without stopping lathe. Time out for changing tools completely eliminated . . . McCrosky Turrets are made in 6 styles with 3 or more sizes in each style. Patented indexing mechanism simple and positive. Ruggedly built for hard work and long life. To find style and size for your lathe send for new Bulletin 14-E.



**Style F McCrosky 4-Way Turret. Takes standard tool bits, 3 indexing positions for each bit. Made in 4 sizes. Mounted in T-slot of compound rest.**

**McCrosky Tool Corporation, Meadville, Pa.**

**WODACK**

**"DO-ALL" COMBINATION ELECTRIC HAMMER AND DRILL**

Drills in concrete, masonry, metal and wood. The drill you need for expansion bolts and screw anchors—installing machinery, fixtures, wiring, piping, etc. Invaluable as maintenance tool. Every plant needs one. Write for prices.

**WODACK ELECTRIC TOOL CORP.**
4635 W. HURON ST., CHICAGO, ILL.



**Dessau Diamond Tools**

CINCINNATI, LANDIS, NORTON & HEALD GRINDERS

Makers of Diamond Tools for over 95 years, for all industrial purposes.

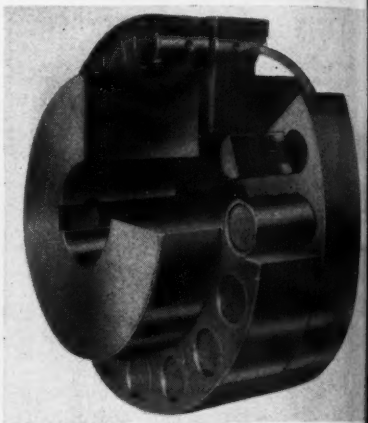
*Send for illustrated folder "S" and Price List.*

**MAURICE S. DESSAU**
6 Maiden Lane, New York City


ibility in mounting. It can be used for surface mounting, and as "built-in" control with the self-contained mounting bracket for front mounting, or without the bracket for back or cavity mounting. The pushbuttons and their protecting shroud are part of the basic switch mechanism and the complete mechanism is housed in its own insulating shell.

## Improved Francke Flexible Coupling

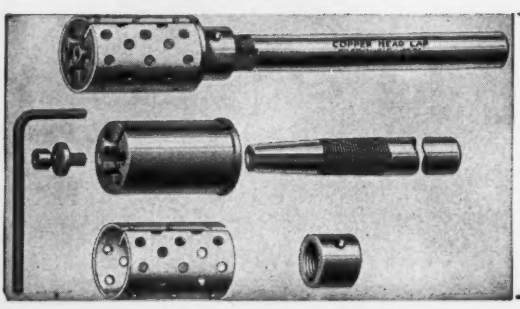
Changes in the design and material of the Francke Flexible Coupling are announced by the John Waldron Corporation, New Brunswick, New Jersey. All Francke Coupling flanges, except the larger sizes, are now being made of a forged high manganese alloy steel. The



**Improved Francke Flexible Coupling**

larger sizes are molded of high grade semi-steel.

In order to prolong the life of the moving parts of the coupling, self-


**LOWER YOUR LAPPING COSTS**

with Groetchen Copper Head Expansion Laps. Profitably used in hundreds of leading shops. Available in sizes from ⅛" to 2½", graduated by sixteenths of an inch. Many other designs for special applications.

*Write for Bulletin C 40*

**GROETCHEN TOOL & MFG. CO.**
124 N. UNION St., CHICAGO, ILL.

# WHY
## *Pay Twice for the Hole?*

The hole in this ring die cost the price of the material plus the labor of removal.

*Save both these costs with*

**BISCO TOOL STEEL TUBING**

Non-shrink — Oil hardening
for
Ring Dies — Spacers — Bushings
Stock up to 12" O. D. — 2" Wall
Larger sizes available
Complete stocks of Ball Bearing Tubing
52100 and 4615 Analysis

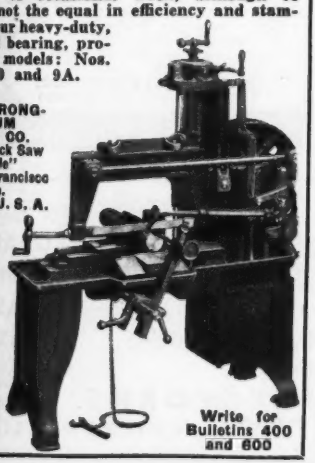
**The Bissett Steel Company**

CLEVELAND
CHICAGO CINCINNATI



# OUTCUTS ALL OTHERS IN ITS PRICE CLASS

A Moderately Priced Hack Saw that will out-cut all others in its price class. A really good highspeed hack saw for ordinary miscellaneous or occasional work, although of course, not the equal in efficiency and stamina of our heavy-duty, full ball bearing, production models: Nos. 4, 4A, 9 and 9A.



ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
345 N. Francisco Ave.
Chicago, U. S. A.

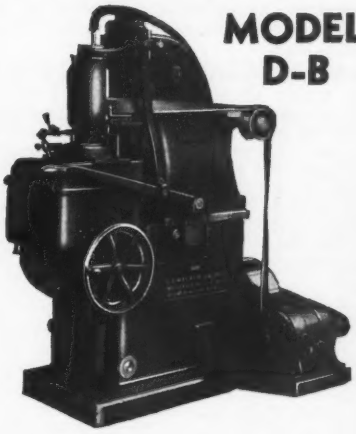
MARVEL
No. 4B
Capacity
6"x6"

Write for Bulletins 400 and 600



# WALKER

**MODEL D-B**



## Single Stroke
### Surface Grinding Machine

DESIGNED to provide ample power, rigidity and accuracy for high production grinding, this machine meets all requirements for efficiently and economically grinding a wide range of jobs.

Machine will handle work up to 12" diameter and 4" high under a new wheel. Work table is a 12" diameter Walker Rotary Magnetic Chuck with 1⅛" center hole. Six work table speeds from 60 to 310 r.p.m. are available. Write for Bulletin D.B. 2.

See this machine and also New Walker Magnetic Chucks in Booth 3 at the Cleveland Show!

**O. S. WALKER CO., Inc.**

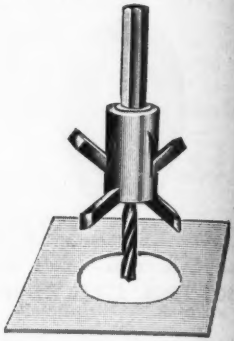
Worcester, Mass.

lubricating, wax impregnated bronze bushings now replace the old style dry bushings. The new bushings have highly polished bearing surfaces which provide a large contact area. Due to their self-lubricating feature, little resistance is offered to the end-wise movement of the shafts of the connected machines when under load.

Another important improvement is in the design of the cross pins by which the crucible spring steel laminations are held within the keepers. The center portion of the cross pins which passes through the perforation in the laminations is now made glass hard. By a special process the ends of the cross pins are expanded into the tapered recesses of the keepers, thereby making it impossible for them to become loose.

## Wyco Hole Cutter

A cutter for use with either a drill press or electric drill to cut round holes in sheet steel, bakelite, fibre, and so on from ⅞ in. to 2½ in. diameter has been placed on the market by Wyzenbeek & Staff, Inc., 642 West Washington Blvd., Chicago, Illinois. The tool is made with a hexagon shank to fit into a ½-in. drill chuck. The cutting tools consist of ¼-in. tool bits, held in a substantial



Wyco Hole Cutter

body. The tool bits can easily be removed for sharpening. The design of the tool is such that the bits are held without the use of clamps, wedges, or set screws. The tool is furnished com-

CHAMPION EXPANDING MANDRELS
Accurate—Efficient
Write for Catalog
THE WESTERN TOOL & MFG. CO.
Springfield, Ohio

EVERY SHOP needs these rugged, accurate, portable Pyrometers. L88 for checking Surface Temperatures: 800° range with 1 ft. silver tip couple, $17.90. L89 for Non-ferrous Metals: 1600° range with 2 ft. couple and 1 ft. replaceable tip, $19.30. L90 for Furnaces: 2500° range with 3 ft. couple, $1.00. Sent on 30-Day Trial. Circular Free.
RUSSELL ELECTRIC CO.
338 W. Huron St., Chicago
Hold-Heet Pyrometers

HINGES
VARIOUS WIDTHS and GAUGES
BUTTS AND CONTINUOUS LENGTHS
WRITE FOR PRICES
For GUARDS CABINETS CASES BOXES
S & S MACHINE WORKS
4541 W. LAKE STREET HARDWARE DIVISION CHICAGO, ILLINOIS

## MIDWEST END MILLS

with Midwest Taper and Pin Drive

•

Perfect alignment with holder

•

Vibration eliminated

•

Different sizes quickly interchanged in same holder

•

Send for New and Complete No. 14-M Midwest Catalog

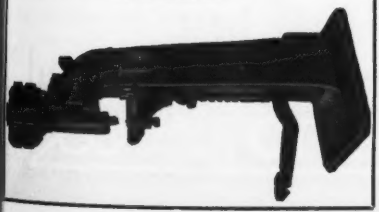
**MIDWEST TOOL & MFG. CO.**
2360 W. Jefferson Ave., Detroit, Mich.

GRANT

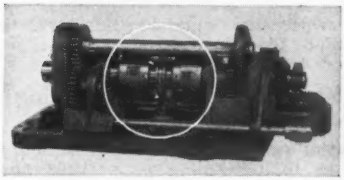
RIVETERS — PIONEERS in their line—Head rivets from smallest to ¾" diameter, either by NOISELESS SPINNING or VIBRATING HAMMER method—Sizes to meet all needs—Types include Vertical and Horizontal Multiple Spindles.

*Write for literature—and don't forget to send samples.*

THE GRANT MFG. & MACHINE CO.
96 Silliman Avenue
BRIDGEPORT, CONN.



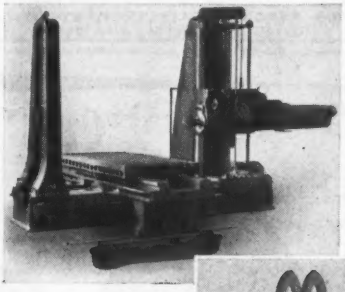




## SATISFACTORY PERFORMANCE UNDER CONTINUOUS OPERATION

"We had to obtain satisfactory performance under continuous operation. This was accomplished by using Twin Disc Close Coupled Duplex Clutches", says K. F. Gallimore, Chief Engineer, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. "We have used Twin Disc Clutches for the past twelve years, and they were selected for our new 30 series Precision Horizontal Boring, Drilling and Milling Machine for their — compactness of design, allowing installation in a minimum space . . . ease of assembly, as they can be built into the machine as an assembled unit . . . simple and positive locked adjustment . . . dependability of operation. Considerable economies were obtained by reduction of service and replacement figures to an extremely low figure." Write for engineering data. Specific recommendations on request.

*Twin Disc Clutch Company, 1326 Racine St., Racine, Wis.*

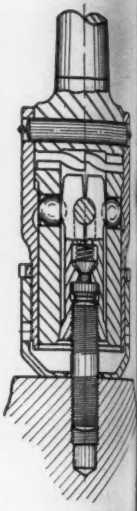


TWIN DISC CLUTCHES

plete with bits and a pilot drill as shown in the illustration.

## Modern Style B Self-Opening Stud Setter

A stud setter the design of which is said to include all the features that contribute to fast and efficient stud setting is now being marketed by Modern Tool Works, 561 Blossom Road, Rochester, New York. The tool is said to operate so easily that it is possible to stop the drive at any point and open the jaws, which is especially advantageous in setting shoulder studs. The ball locking device for the jaws prevents their opening during the drive until the stud is set to the desired depth.



Modern Style B Self-Opening Stud Setter

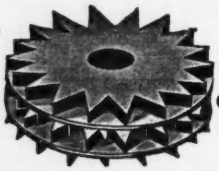
The tool is guided centrally over the stud by means of a pilot hole in the closed-up stop collar. The jaws remain open until contact of the stud with the stud stop compresses the stud stop spring and brings the threads in the jaws into full register on the stud. At this point the balls are locked in the driving position and the driving clutch is engaged.

When the stud is set to within ⅛ in. of the desired height, the stop collar should be in contact with either the piece in which the stud is being set or with the plate governing the height of the stud. The tool is then kept from moving forward and the lack of the thread on the end of the stud entering the work disengages the clutch. The jaws remain engaged on the stud until they are opened by the action of lifting the stud setter off the stud.

An important feature of the Style B Stud Setter is the manner in which the drive is applied to the jaws. The drive is carried from the shank clutch through the driving clutch to a rectangular

**Grinding Wheel Dressers**

We make all types of Dressers and Cutters



Write for Catalog "M"

DESMOND-STEPHAN MFG. CO.
URBANA, OHIO

PYRO THE SIMPLIFIED OPTICAL PYROMETER

Unique construction enables operator to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.
THE PYROMETER INSTRUMENT CO.
101-105 Lafayette St., New York

"OUTWEARS the best Bronze Metal"

20 years without a drink—

ARGUTO OILLESS BEARING CO.
Wayne Junction, Philadelphia, Pa.

Write for quotation on standard Woodruff Keyway Cutters

QUALITY

*Special Cutters made to Blue Prints*

QUALITY TOOL WORKS

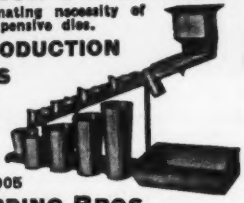
Waukegan, Illinois

**SHORT RUN STAMPINGS**

A process eliminating necessity of making expensive dies.

**ALSO PRODUCTION STAMPINGS**

We specialize in building mechanical devices. Write for estimates.



Established 1905

**GERDING BROS.**

5 E. THIRD ST. CINCINNATI, O.

**PEERLESS SURFACERS**

Give a high quality, straight line finish to metal, rubber, fibre composition, wood, etc.

QUICK
HANDY
LABOR
SAVING

Vertical or horizontal 4" to 20"

**PRODUCTION MACHINE CO.**

GREENFIELD, MASS.

*Self-Contained .... Efficient*

**GEARED**

**MOTORPUMPS**

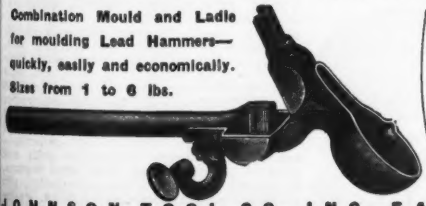
*for either* Horizontal or Vertical Mounting. . . . Helical Gears in Pump and in Gear Reduction insure satisfactory performance.

Brown & Sharpe Mfg. Co., Providence, R. I.

**BROWN & SHARPE PUMPS**

**● "MOLD YOUR OWN" or BUY 'EM JOHNSON MADE ●**

Combination Mould and Ladle for moulding Lead Hammers—quickly, easily and economically. Sizes from 1 to 6 lbs.

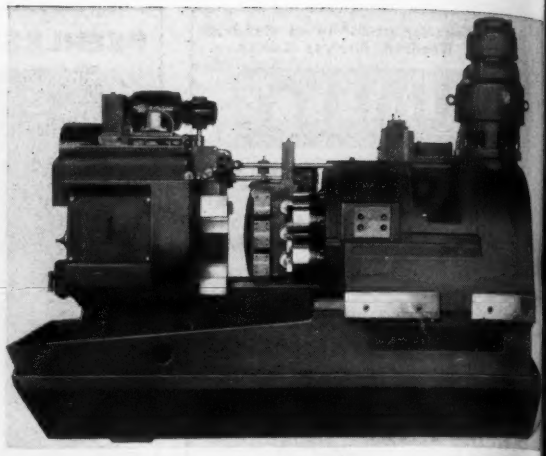


Lead hammers with new Shur-Grip handle—sizes from 1 lb. to 6 lbs. always in stock. Illustrated folder sent on request.

JOHNSON TOOL CO., INC., EAST PROVIDENCE, R. I.

on the jaws in the lower end, thus relieving the jaws of torsional strain. The jaws are always in the open position except when engaged with or driving the stud. The action of the tool is positive and automatic, and it can be operated in any position with either portable or stationary tools. The tool is made in two sizes with maximum capacities of ½ in. and ⅝ inch.

## Goss & De Leeuw 5-Spindle Chucking Machine



Goss & DeLeeuw 5-Spindle Chucking Machine

The Goss & DeLeeuw Machine Company, New Britain, Connecticut has developed a Five Spindle Work Rotating Chucking Machine shown herewith. The machine, of durable and rigid construction, contains numerous features in advanced chucking machine design, including direct connected motors, a new spindl clutch construction, new cross slide co struction, built-in electrical control wi electrically operated chucks, and a wi range of spindle speeds.

The feed and index action is controll

NATIONAL Tool Salvage Service will save you approximately

50%

on Milling Cutters, Drills and Reamers.

NATIONAL TOOL SALVAGE COMPANY

3818 Beaubien St. Detroit, Michigan

OSGOOD'S New UNIVERSAL Balanced-Grip Handle.

Steel Lined, "Super-Strong" construction, with horizontal gripping grooves.

100% efficient, for strength, durability, and economy for every service where handles are used. Highest efficiency for all horizontal or angular motions, for files, saws, all types of metal and wood turning, spinning, burnishing tools, etc. Also highest efficiency for all tools requiring circular motion, with the gripping grooves make easy grip with powerful force for screw drivers having flat file tapered shank inserted. For socket wrenches—rapidly and firmly tightening bolts and nuts in close quarters. For hand reamers, broaches, taps, wood bits and gimlets and all tools requiring circular motion. Faster and more economical than the old clumsy wrenches.

Never Cramps Never Slips Easy Grip

Write for price list. Sample handle for 10c, or handle and FILEGRIP for 25c.

J. L. OSGOOD HANDLE CO.

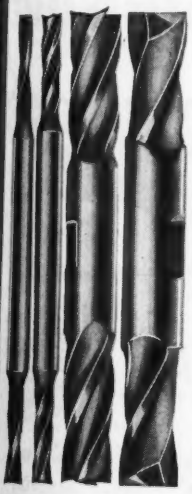
43 PEARL ST. BUFFALO, N. Y.

ALL STYLES **CAMS** SIZES UP TO 50"
GENEVA MOTIONS
MADE TO CUSTOMER'S SPECIFICATIONS
**KUX-LOHNER MACHINE CO.**
2147 Lexington St. Chicago, Ill.

**Ohio Gears**

| STOCK GEARS | SPLINED SHAFTS |
|---|---|
| SPECIAL GEARS | SPROCKETS |

*Write for Gear Catalog and quotation on your requirements.*
**THE OHIO GEAR COMPANY**
1337 E. 179th St., Cleveland, Ohio



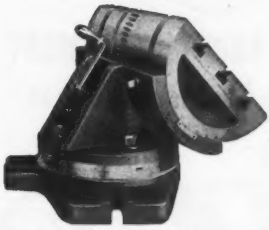
**SHEAR CUT**
Single
and Double
**END MILLS**

THEY shear cut the metal instead of the old way of cutting. They leave that smooth finish you want. It is the way they are ground. Give them a trial and see for yourself. You get two for the price of one.

Send for a new catalog showing other sizes and styles.

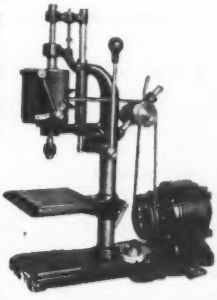
**Progressive Tool & Cutter Co.**
FERNDALE MICHIGAN

**YOU OUGHT TO HAVE THESE**



The Boston Universal Angle Plate is an accurate tool adaptable to all phases of machine work—miller, drill, planer and shaper.

It eliminates costly fixtures, decreases production costs, increases jobbing output. Every machine shop will find this tool a good investment.



This Victor 5-Speed Super Drill is a real cost-reducing bench tool. The Wonder pulley which enables operator to change speeds instantly, is just one of 10 outstanding features. No belts to change. Ball bearings at all points of wear eliminate the necessity of constant oiling and since friction is reduced, long life is assured. Accurately built of ample proportion, this versatile drill is an excellent buy.

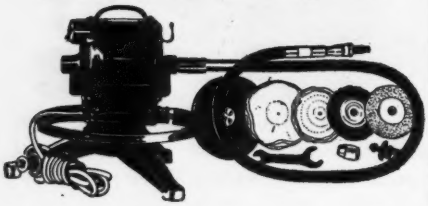
*Write for circulars and prices.*

**U. S. Automatic Box Mach'ry Co., Inc.**
459 Watertown Street
NEWTONVILLE, BOSTON, MASS.

The WYCO Line

**FLEXIBLE SHAFT EQUIPMENT**

**Quality at Reasonable Prices**



**Sizes from ¼ to 1 H. P.**

**Prices, $35.00 to $105.00**

**COMPLETE WITH ACCESSORIES**

*A new addition to the Wyco Line.*

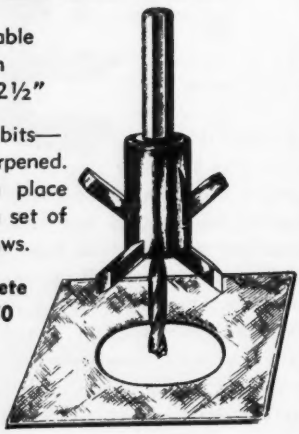
**WYCO HOLE CUTTER**

Adjustable from 7/8" to 2½"

Uses tool bits—Easily sharpened. Takes the place of a whole set of hole saws.

**Complete $2.50**

Ask your dealer or write for catalog



**WYZENBEEK & STAFF, Inc.**

*Manufacturers*

642 Washington Blvd. Chicago, Ill.

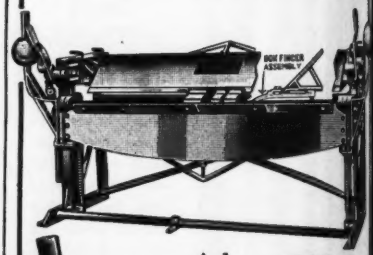
by a 3-h.p. motor which runs constantly. The spindles are driven by a 10-, 15-, or 20-h.p. motor which runs intermittently by means of an automatic switch controlled by the forward and backward movement of the tool slide.

Each spindle is equipped with a positive jaw clutch. To stop the loading position spindle, a cam is incorporated to provide for the engaging and disengaging of the spindle clutch during the indexing cycle, at which time the spindle drive motor is stopped. This permits engaging of clutches without noise or shock.

Three heavy-duty cross slides are provided in 2nd, 3rd, and 4th spindle positions, located at the rear of the machine, each of which is operated direct by means of individual hardened steel cams. All spindles and other important bearings are anti-friction.

Electric chucking is provided by means of mounting at the rear of each spindle a reversing torque motor, operated in the loading position by convenient push buttons. The maximum swing of work is 8 in. maximum travel of main tool slide, 6¾ in; maximum travel of cross slide, 6¼ in. Chucks 8 in. in diameter are supplied in 2- or 3-jaw type. Production cycle 15 to 600 per hour. Weight approximates 20,000 lbs.

**WHITNEY-JENSEN BRAKE**



Ask for Cat. No. 9

**No. 4 Angle Iron Shear** **No. 8 Imperial Punch**

**WHITNEY METAL TOOL Co.**

**91 FORBES ST. ROCKFORD, ILL.**